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INFINITE RICHES IN A LITTLE ROOM.

—Christopher Marlowe.

# NEW AMERICANIZED ENCYCLOPÆDIA BRITANNICA

REVISED AND AMENDED.

A DICTIONARY OF ARTS, SCIENCES AND LITERATURE

TO WHICH IS ADDED

BIOGRAPHIES OF LIVING SUBJECTS

96 Colored Maps and Numerous Illustrations.



EDITED BY

W. H. DEPUY, D.D., LL.D.

And a Corps of Eminent Writers.

VOL. V.—EVE—GRE.



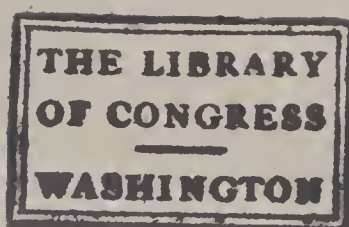
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# NEW AMERICANIZED ENCYCLOPÆDIA BRITANNICA.

## VOLUME V.

### E V E

**EVEMERUS**, or **EUHEMERUS**, a Greek mythographer, who flourished in the latter half of the fourth century, B.C.

**EVERDINGEN**, **ALLART VON**, the son of a government clerk at Alkmaar, was born about 1621. He produced representations of inland scenery, and particularly of Norwegian valleys, remarkable alike for wildness and a decisive depth of tone. He died about 1676.

**EVEREST**, **SIR GEORGE**, C.B., a distinguished surveyor and geographer, was born July 4, 1790. The geodetical labors of Sir George Everest rank among the finest achievements of their kind; and more especially his measurement of the meridional arc of India,  $11\frac{1}{2}^{\circ}$  in length, is accounted as unrivaled in the annals of the science. In great part the Indian survey is what he made it. The name of Everest has been given in his honor to the highest ascertained peak of the Himalayas, and thus of the world. He died December 1, 1866.

**EVERETT**, a city of Middlesex county, Mass., is situated in Everett township, three miles north of Boston, with which city it is connected by street railway; it is also at the junction of the Saugus branch with the main line of the Eastern Extension railroad. The city contains one savings bank, two weekly papers, several churches, graded schools, a young ladies' institute, and many handsome private residences. In the way of manufactures Everett is prominent, being the location of extensive plants for the production of chemicals, paints, thread, rope, druggists' fixtures, parlor furniture, and some descriptions of machinery. The population is 11,068.

**EVERETT**, **ALEXANDER HILL**, an American author and diplomatist, born at Boston, March 19, 1792, was the son of Rev. Oliver Everett, for some time a Congregational minister in Boston, and afterward judge of probate for Norfolk county. He graduated at Harvard College, Cambridge, in 1806, taking the highest honors of his year, though the youngest member of his class. A year after he began the study of law in the office of John Quincy Adams, afterward President of the United States. In 1809 Adams was appointed minister to Rus-

sia, and Everett accompanied him as his private secretary, remaining attached to the American legation in Russia until 1811. His assiduity in the diplomatic career resulted in his promotion successively to the position of secretary of legation, and afterward of *chargé d'affaires* at The Hague. He was subsequently minister to Spain, under the presidency of John Quincy Adams. He died May 29, 1847, at Hong Kong, whither he had been sent as commissioner of the United States.

**EVERETT**, **EDWARD**, brother of the preceding, was born in Dorchester, near Boston, on November 11, 1794. His father died in his childhood, and his mother removed to Boston with her family after her husband's death. When he was little more than thirteen he entered Harvard College; and as the full undergraduate course is four years, he became "bachelor of arts" at seventeen. He then took the first college honors of his class. While at college he was the chief editor of *The Lyceum*, the earliest in the series of college journals published at the American Cambridge. His earlier predilections were for the study of law, but the advice of Joseph Stevens Buckminster, a distinguished preacher in Boston, led him to prepare for the pulpit, and in this calling he at once distinguished himself. He was called to the ministry of one of the largest Boston churches before he was twenty years old. His sermons and his theological writings attracted wide attention in that community. But his tastes were then, as always, those of a scholar; and, in 1814, after a service of a little more than a year in the pulpit, he resigned his charge to accept a professorship of Greek literature in Harvard College. After nearly five years spent in Europe in preparation, he entered with alacrity on his duties, and, for five years more, gave a vigorous impulse, not simply to the study of Greek, but to all the work of the college. About the same time he assumed the charge of the *North American Review*, which now became a quarterly.

In 1824 he was chosen a member of Congress, and held a seat for ten years, supporting generally the administration of Adams, and in opposition to that of Jackson, which succeeded it. In the winter of 1835 he



was nominated as Governor of Massachusetts, and was chosen in the autumn of the same year. He brought to the duties of the office the untiring diligence which is the characteristic of his public life. We can only allude to a few of the measures which received his efficient support — *e. g.*, the establishment of the board of education, the first of such boards in the United States, the scientific surveys of the State, the first of such public surveys, the criminal law commission, and the preservation of a sound currency under the panic of 1837.

Everett filled the office of governor for four years. The political parties in Massachusetts were at this time very nearly balanced, and divisions of opinion on local questions (the militia and temperance laws) caused his defeat at the election in November, 1839. Judge Morton, the opposing candidate, succeeded by a single vote, out of more than a hundred thousand. Everett availed himself of this opportunity, the following spring, to make a visit with his family to Europe. In 1841, while residing in Florence, he was named United States minister to England, and arrived in London to enter upon the duties of his mission at the close of that year. Great questions were at that time open between the two countries — the northeastern boundary, the affair of M'Leod, the seizure of American vessels on the coast of Africa, in the course of a few months the affair of the *Creole*, to which were soon added Oregon and Texas. His position was more difficult by the frequent changes that took place in the department at home, which, in the course of two years, was occupied successively by Messrs. Webster, Legaré, Upshur, Calhoun, and Buchanan. From all these gentlemen Everett received marks of approbation and confidence.

Immediately after the accession of Polk to the presidency Everett was recalled. Shortly before his return the presidency of Harvard College was vacated by the resignation of Hon. Josiah Quincy, and Everett was strongly urged by the friends and governors of the institution to accept this office, which he did in the month of January, 1846. He filled this place of equal distinction and usefulness for about three years. It was a position congenial with his tastes, in harmony with the early associations of his life, and one which seemed to promise large opportunity of applying for the benefit of the rising generation the fruit of his maturer studies and varied experience in life. His health, unfortunately, soon began to suffer, and before long became seriously impaired under the burdens and cares of the office, and he was compelled, at the close of the year 1848, to tender his resignation. But, on the death of his friend, Webster, to whom he had always been closely attached, and of whom he was always a confidential adviser, he was named by President Fillmore secretary of state, and he held that post for the remaining months of Fillmore's administration, leaving it to go into the Senate as the representative of Massachusetts.

But, as it proved, the remaining ten years of his life most widely established his reputation and influence throughout America. As early as 1820 he had established a reputation, such as few men in later days have enjoyed, as an orator. Eager to avert, if possible, the impending conflict of arms, Everett prepared an "oration" on Washington, which he delivered in every part of America. In a printed note accompanying the published edition of it, he names nearly 125 occasions, in almost every State in the Union, in every section but the extreme Southwest, where it was repeated. This exception was caused only by illness in his family, after he had received invitations to go to that quarter also. He traveled really as an ambassador of peace among irritated States. The eagerness to hear him was so great that, from the first, his hosts arranged, almost al-

ways, that tickets should be sold to all auditors; and as he traveled wholly at his own charges, the audiences thus contributed more than \$100,000 for the purchase of the old home of Washington at Mount Vernon, and the securing it as a shrine for American patriotism.

Everett's name, in direct violation of his wishes, was presented, with Mr. Bell's, as a candidate of North and South jointly for vice-president in the election of 1860, when Abraham Lincoln was elected. The Civil War followed. Reconciliation was impossible, and he gave all his learning, zeal, and eloquence to the support of the national government. For four years he was the trusted adviser of every department; he was called upon in every quarter to speak at public meetings. He delivered the last of his great orations at Gettysburg, after the battle, on the consecration of the national cemetery there. Early in 1865, the success of the national arms was certain. He had the pleasure of speaking at a public meeting in Boston to raise funds for the Southern poor in Savannah, just taken by General Sherman. At that meeting he caught cold, which was followed by sudden illness, and by his death January 15, 1865.

EVERGREENS are those trees and shrubs of which the leaves do not fall off in autumn, but retain their verdure throughout the winter, and perform their functions during more than one season. Evergreen leaves are generally of thicker and firmer texture than the leaves of deciduous trees and shrubs. They have also fewer pores or *stomata*, and these confined to their under surface. Most of the *Coniferae* are evergreens, and some grow to a considerable size.

EVERLASTING FLOWER, the popular name of certain plants, the flowers of which suffer little change of appearance in drying, and may be kept for years without much diminution of beauty. They are plants of the order *Compositae*. The French call them *immortelles*, and in France they are often woven into circular wreaths, and placed beside recent graves, as emblems of immortality.

EVESHAM, a municipal and parliamentary borough and market town of Worcestershire, Eng., is situated in the vale of Evesham, on the river Avon, over which there is an ancient stone bridge of eight arches, connecting it with Bengeworth parish, which forms part of the borough. At Evesham was fought, on August 14, 1265, the famous battle between Prince Edward, afterward Edward I., and Simon de Montfort, Earl of Leicester, in which the latter was totally defeated, and he and his son slain. Population, 5,376.

EVIDENCE. It is necessary to distinguish two common meanings of the word evidence which are not infrequently confused. Evidence sometimes means the ascertained facts from which we infer the existence of some other fact or principle. It also means the testimony of persons as to the existence of facts, from which testimony we infer that these or other facts do or do not exist. It is the latter sense alone which is appropriate in speaking of judicial evidence. The rules of the law of evidence are based chiefly on considerations relating to human testimony. Their fundamental purpose is to guard and test the truthfulness of statements as to matters of fact made in a court of justice. The further question, what conclusion is to be drawn from the facts, supposing them to be true, is the subject of few if any specific rules. The general theory of relevancy excludes testimony relating to facts from which no conclusion whatever could be drawn with reference to the facts in issue. On the other hand, in the case of what is called "conclusive proof," the law directs that on certain evidence the judge must regard some fact as proved and reject any evidence offered against it. Between these two extremes the law leaves the relation between facts



in evidence and facts in issue to the unaided logic or common sense of the tribunal.

EVOLUTION. In the former half of the eighteenth century, the term "evolution" was introduced into biological writings, in order to denote the mode in which some of the most eminent physiologists of that time conceived that the generation of living things took place; in opposition to the hypothesis advocated in the preceding century by Harvey, in that remarkable work which would give him a claim to rank among the founders of biological science, even had he not been the discoverer of the circulation of the blood.

One of Harvey's prime objects is to defend and establish on the basis of direct observation, the opinion already held by Aristotle; that, in the higher animals at any rate, the formation of the new organism by the process of generation takes place, not suddenly, by simultaneous accretion of rudiments of all or the most important of the organs of the adult; nor by sudden metamorphosis of a formative substance into a miniature of the whole, which subsequently grows; but by *epigenesis*, or successive differentiation of a relatively homogeneous rudiment into the parts and structures which are characteristic of the adult.

Harvey proceeds to contrast this view with that of the "Medici," or followers of Hippocrates and Galen, who, "badly philosophizing," imagined that the brain, the heart, and the liver were simultaneously first generated in the form of vesicles; and, at the same time, while expressing his agreement with Aristotle in the principle of epigenesis, he maintains that it is the blood which is the primal generative part, and not, as Aristotle thought, the heart.

In the latter part of the seventeenth century, the doctrine of epigenesis thus advocated by Harvey was controverted on the ground of direct observation by Malpighi, who affirmed that the body of the chick is to be seen in the egg before the *punctum sanguineum* makes its appearance. But from this perfectly correct observation a conclusion which is by no means warranted was drawn; namely, that the chick as a whole really exists in the egg antecedently to incubation; and that what happens in the course of the latter process is no addition of new parts, but a simple expansion or unfolding of the organs which already exist, though they are too small and inconspicuous to be discovered. The weight of Malpighi's observations therefore fell into the scale of that doctrine which Harvey terms metamorphosis, in contradistinction to epigenesis.

The views of Malpighi were warmly welcomed on philosophical grounds by Leibnitz, who found in them a support to his hypothesis of monads, and by Malebranche; while, in the middle of the eighteenth century, not only speculative considerations, but a great number of new and interesting observations on the phenomena of generation, led the ingenious Bonnet, and Haller, the first physiologist of the age, to adopt, advocate, and extend them.

Bonnet affirms that, before fecundation, the hen's egg contains an excessively minute but complete chick; and that fecundation and incubation simply cause this germ to absorb nutritious matters, which are deposited in the interstices of the elementary structures of which the miniature chick, or germ, is made up. The consequence of this intussusceptive growth is the "development" or "evolution" of the germ into the visible bird. Thus an organized individual "is a composite body consisting of the original, or *elementary* parts, and of the matters which have been associated with them by the aid of nutrition;" so that, if these matters could be extracted from the individual (*tout*), it would, so to speak, become concentrated in a point, and would thus be

restored to its primitive condition of a *germ*; "just as, by extracting from a bone the calcareous substance which is the source of its hardness, it is reduced to its primitive state of gristle or membrane."

"Evolution" and "development" are, for Bonnet, synonymous terms; and since by "evolution" he means simply the expansion of that which was invisible into visibility, he was naturally led to the conclusion, at which Leibnitz had arrived by a different line of reasoning, that no such thing as generation, in the proper sense of the word, exists in nature. The growth of an organic being is simply a process of enlargement, as a particle of dry gelatine may be swelled up by the intussusception of water; its death is a shrinkage, such as the swelled jelly might undergo on dessication. Nothing really new is produced in the living world, but the germs which develop have existed since the beginning of things; and nothing really dies, but, when what we call death takes place, the living thing shrinks back into its germ state.

The two parts of Bonnet's hypothesis, namely, the doctrine that all living things proceed from preëxisting germs, and that these contain, one inclosed within the other, the germs of all future living things, which is the hypothesis of "*emboîtement*;" and the doctrine that every germ contains in miniature all the organs of the adult, which is the hypothesis of evolution or development, in the primary senses of these words, must be carefully distinguished. In fact, while holding firmly by the former, Bonnet more or less modified the latter in his later writings and, at length, he admits that a "germ" need not be an actual miniature of the organism; but that it may be merely an "original preformation" capable of producing the latter.

But, thus defined, the germ is neither more nor less than the "*particula genitalis*" of Aristotle, or the "*primordium vegetale*" or "*ovum*" of Harvey; and the "evolution" of such a germ would not be distinguishable from "epigenesis."

Supported by the great authority of Haller, the doctrine of evolution, or development, prevailed throughout the whole of the eighteenth century, and Cuvier appears to have substantially adopted Bonnet's later views, though probably he would not have gone all lengths in direction of "*emboîtement*."

Bonnet's eminent contemporary, Buffon, held nearly the same views with respect to the nature of the germ, and expresses them even more confidently.

It is a striking example of the difficulty of getting people to use their own powers of investigation accurately, that this form of the doctrine of evolution should have held its ground so long; for it was thoroughly and completely exploded, not long after its enunciation, by Caspar Frederick Wolff, who in his *Theoria Generationis*, published in 1759, placed the opposite theory of epigenesis upon the secure foundation of fact, from which it has never been displaced. But Wolff had no immediate successors. The school of Cuvier was lamentably deficient in embryologists; and it was only in the course of the first thirty years of the present century, that Prévost and Dumas in France, and, later on, Döllinger, Pander, Von Bär, Rathke, and Remak in Germany, founded modern embryology; and, at the same time, proved the utter incompatibility of the hypothesis of evolution as formulated by Bonnet and Haller, with easily demonstrable facts.

Nevertheless, though the conceptions originally denoted by "evolution" and "development" were shown to be untenable, the words retained their application to the process by which the embryos of living beings gradually make their appearance; and the terms "Development," "Entwicklung," and "Evolutio," are now indis-



criminally used for the series of genetic changes exhibited by living beings, by writers who would emphatically deny that "Development," "Entwickelung" or "Evolutio," in the sense in which these words were usually employed by Bonnet or Haller, ever occurs.

Evolution, or development, is, in fact, at present employed in biology as a general name for the history of the steps by which any living being has acquired the morphological and the physiological characters which distinguish it. As civil history may be divided into biography, which is the history of individuals, and universal history, which is the history of the human race, so evolution falls naturally into two categories—the evolution of the individual, and the evolution of the sum of living beings. It will be convenient to deal with the modern doctrine of evolution under these two heads.

No exception is, at this time, known to the general law, established upon an immense multitude of direct observations, that every living thing is evolved from a particle of matter in which no trace of the distinctive characters of the adult form of that living thing is discernible. This particle is termed a *germ*.

The definition of a germ as "matter potentially alive, and having within itself the tendency to assume a definite living form," appears to meet all the requirements of modern science. For, notwithstanding it might be justly questioned whether a germ is not merely potentially, but rather actually, alive, though its vital manifestations are reduced to a minimum, the term "potential" may fairly be used in a sense broad enough to escape the objection. And the qualification of "potential" has the advantage of reminding us that the great characteristic of the germ is not so much what it is, but what it may, under suitable conditions, become. Harvey shared the belief of Aristotle—whose writings he so often quotes, and of whom he speaks as his precursor and model, with the generous respect with which one genuine worker should regard another—that such germs may arise by a process of "equivocal generation" out of non-living matter; and the aphorism so commonly ascribed to him, "*omne vivum ex ovo*" (all that lives comes from the egg), and which is indeed a fair summary of his reiterated assertions, though incessantly employed against the modern advocates of spontaneous generation, can be honestly so used only by those who have never read a score of pages of the *Exercitationes*. Harvey, in fact, believed as implicitly as Aristotle did in the equivocal generation of the lower animals. But, while the course of modern investigation has only brought out into greater prominence the accuracy of Harvey's conception of the nature and mode of development of germs, it has as distinctly tended to disprove the occurrence of equivocal generation, or abiogenesis, in the present course of nature. In the immense majority of both plants and animals, it is certain that the germ is not merely a body in which life is dormant or potential, but that it is itself simply a detached portion of the substance of a preëxisting living body; and the evidence has yet to be adduced which will satisfy any cautious reasoner that "*omne vivum ex vivo*" (all that lives originates from life), is not as well established a law of the existing course of nature as "*omne vivum ex ovo*."

In all instances which have yet been investigated, the substance of this germ has a peculiar chemical composition, consisting of, at fewest, four elementary bodies, viz.: carbon, hydrogen, oxygen, and nitrogen, united into the ill-defined compound known as protein, and associated with much water, and very generally, if not always, with sulphur and phosphorus in minute propor-

tions. Moreover, up to the present time, protein is known only as a product and constituent of living matter. Again, a true germ is either devoid of any structure discernible by optical means, or, at most, it is a simple nucleated cell.

In all cases, the process of evolution consists in a succession of changes of the form, structure, and functions of the germ, by which it passes, step by step, from an extreme simplicity, or relative homogeneity, of visible structure, to a greater or less degree of complexity or heterogeneity; and the course of progressive differentiation is usually accompanied by growth, which is effected by intussusception. This intussusception, however, is a very different process from that imagined either by Buffon, or by Bonnet. The new material is, in great measure, not only absorbed but assimilated, so that it becomes part and parcel of the molecular structure of the living body into which it enters. And, so far from the fully developed organism being simply the germ *plus* the nutriment which it has absorbed, it is probable that the adult contains neither in form, nor in substance, more than an inappreciable fraction of the constituents of the germ, and that it is almost wholly made up of assimilated and metamorphosed nutriment. In the great majority of cases, at any rate, the full grown organism becomes what it is by the absorption of not-living matter, and its conversion into living matter of a specific type.

In all animals and plants above the lowest, the germ is a nucleated cell, using that term in its broadest sense; and the first step in the process of the evolution of the individual is the division of this cell into two or more portions. The process of division is repeated, until the organism, from being unicellular, becomes multicellular. The single cell becomes a cell-aggregate; and it is to the growth and metamorphosis of the cells of the cell-aggregate thus produced, that all the organs and tissues of the adult owe their origin.

In certain animals belonging to every one of the chief groups into which the *Metazoa* are divisible, the cells of the cell-aggregate which results from the process of yolk division, and which is termed a *morula*, diverge from one another in such a manner as to give rise to a central space, around which they dispose themselves as a coat or envelope; and thus the morula becomes a vesical filled with fluid, the *planula*. The wall of the planula is next pushed in on one side, or invaginated, whereby it is converted into a double walled sac with an opening, the *blastopore*, which leads into the cavity lined by the inner wall. This cavity is the primitive alimentary cavity, or *archenterom*; the inner, or invaginated, layer is the *hypoblast*, the outer the *epiblast*; and the embryo, in this stage, is termed a *gastrula*. In all the higher animals, a layer of cells makes its appearance between the hypoblast and the epiblast, and is termed the *mesoblast*. In the further course of development, the epiblast becomes the ectoderm or epidermic layer of the body; the hypoblast becomes the epithelium of the middle portion of the alimentary canal; and the mesoblast gives rise to all the other tissues, except the central nervous system, which originates from an ingrowth of the epiblast.

With more or less modification in detail, the embryo has been observed to pass through these successive evolutionary stages in sundry Sponges, Coelenterates, Worms, Echinoderms, Tunicates, Arthropods, Mollusks, and Vertebrates; and there are valid reasons for the belief, that all animals of higher organization than the *Protozoa* agree in the general character of the early stages of their individual evolution. Each, starting from the condition of a simple nucleated cell, becomes a cell-aggregate; and this passes through a condition which



represents the gastrula stage, before taking in the features distinctive of the group to which it belongs.

So far as individual plants and animals are concerned, therefore, evolution is not a speculation but a fact; and it takes place by epigenesis.

Nevertheless, though the doctrine of epigenesis, as understood by Harvey, has definitively triumphed over the doctrine of evolution as understood by his opponents of the eighteenth century, it is not impossible that, when the analysis of the process of development is carried still further, and the origin of the molecular components of the physical gross, though sensibly minute, bodies which we term germs is traced, the theory of development will approach more nearly to metamorphosis than to epigenesis. Harvey thought that impregnation influenced the female organism as a contagion; and that the blood, which he conceived to be the first rudiment of the germ, arose in the clear fluid of the "colliquamentum" of the ovum by a process of concrescence, as a sort of living precipitate. We now know, on the contrary, that the female germ or ovum, in all the higher animals and plants, is a body which possesses the structure of a nucleated cell; that impregnation consists in the fusion of the substance of another more or less modified nucleated cell, the male germ, with the ovum; and that the structural components of the body of the embryo are all derived, by a process of division, from the coalesced male and female germs. Hence it is conceivable, and indeed probable, that every part of the adult contains molecules derived both from the male and from the female parent; and that, regarded as a mass of molecules, the entire organism may be compared to a web of which the warp is derived from the female and the woof from the male. And each of these may constitute one individuality, in the same sense as the whole organism is one individual, although the matter of the organism has been constantly changing.

*The Evolution of the Sum of Living Beings.*—The notion that all kinds of animals and plants may have come into existence by the growth and modification of primordial germs, is as old as speculative thought; but the modern scientific form of the doctrine can be traced historically to the influence of several converging lines of philosophical speculation and of physical observation, none of which go further back than the seventeenth century. These are:

1. The enunciation by Descartes of the conception that the physical universe, whether living or not living, is a mechanism, and that, as such, it is explicable on physical principles.

2. The observation of the gradations of structure, from extreme simplicity to very great complexity, presented by living things, and of the relation of these graduated forms to one another.

3. The observation of the existence of an analogy between the series of gradations presented by the species which compose any great group of animals or plants, and the series of embryonic conditions of the highest members of that group.

4. The observation that large groups of species of widely different habits present the same fundamental plan of structure; and that parts of the same animal or plant, the functions of which are very different, likewise exhibit modifications of a common plan.

5. The observation of the existence of structures, in a rudimentary and apparently useless condition, in one species of a group, which are fully developed and have definite functions in other species of the same group.

6. The observation of the effects of varying conditions in modifying living organisms.

7. The observation of the facts of geographical distribution.

8. The observation of the facts of the geological succession of the forms of life.

Notwithstanding the elaborate disguise which fear of the powers that were led Descartes to throw over his real opinions, it is impossible to read the *Principes de la Philosophie* without acquiring the conviction that this great philosopher held that the physical world and all things in it, whether living or not living, have originated by a process of evolution, due to the continuous operation of purely physical causes, out of a primitive relatively formless matter.

Thus, in the end of the seventeenth century, the seed was sown which has at intervals brought forth recurrent crops of evolution hypotheses, based, more or less completely, on general reasonings.

The first three volumes of Treviranus' *Biologie*, which contains his general views of evolution, appeared between 1802 and 1805. The *Recherches sur l'organisation des corps vivants*, which sketches out Lamarck's doctrines, was published in 1802, but the full development of his views, in the *Philosophie Zoologique*, did not take place until 1809.

The *Biologie* and the *Philosophie Zoologique* are both very remarkable productions, and are still worthy of attentive study, but they fell upon evil times. The vast authority of Cuvier was employed in support of the traditionally respectable hypotheses of special creation and of catastrophism, and the wild speculations of the *Discours sur les Révolutions de la Surface du Globe* were held to be models of sound scientific thinking, while the really much more sober and philosophical hypotheses of the *Hydrogéologie* were scouted.

Nevertheless, the work had been done. The conception of evolution was henceforward irrepressible, and it incessantly reappears, in one shape or another, up to the year 1858, when Mr. Darwin and Mr. Wallace published their *Theory of Natural Selection*. The *Origin of Species* appeared in 1859, and it is within the knowledge of all whose memories go back to that time, that, henceforth, the doctrine of evolution has assumed a position and acquired an importance which it never before possessed. In the *Origin of Species*, and in his other numerous and important contributions to the solution of the problem of biological evolution, Mr. Darwin confines himself to the discussion of the causes which have brought about the present condition of living matter, assuming such matter to have once come into existence. On the other hand, Mr. Spencer and Professor Haeckel have dealt with the whole problem of evolution. The profound and vigorous writings of Mr. Spencer embody the spirit of Descartes in the knowledge of our own day, and may be regarded as the "Principes des Philosophie" of the nineteenth century, while, whatever hesitation may not infrequently be felt by less daring minds, in following Haeckel in many of his speculations, his attempt to systematize the doctrine of evolution and to exhibit its influence as the central thought of modern biology, cannot fail to have a far-reaching influence on the progress of science.

If we seek for the reason of the difference between the scientific position of the doctrine of evolution a century ago, and that which it occupies now, we shall find it in the great accumulation of facts, the several classes of which have been enumerated above, under the second to the eighth heads. For those which are grouped under the second to the seventh of these classes, respectively, have a clear significance on the hypothesis of evolution, while they are unintelligible if that hypothesis be denied. And those of the eighth group are not only unintelligible without the assumption of evolution, but can be proved never to be discordant with that hypothesis, while, in some cases, they are exactly such as



the hypothesis requires. The demonstration of these assertions would require a volume, but the general nature of the evidence on which they rest may be briefly indicated.

The accurate investigation of the lowest forms of animal life, commenced by Leeuwenhoek and Swammerdam, and continued by the remarkable labors of Reaumur, Trembley, Bonnet, and a host of other observers in the latter part of the seventeenth and the first half of the eighteenth centuries, drew the attention of biologists to the gradation in the complexity of organization which is presented by living beings, and culminated in the doctrine of the "*échelle des êtres*," so powerfully and clearly stated by Bonnet; and, before him, adumbrated by Locke and by Leibnitz. In the then state of knowledge, it appeared that all the species of animals and plants could be arranged in one series; in such a manner that, by insensible gradations, the mineral passed into the plant, the plant into the polype, the polype into the worm, and so, through gradually higher forms of life, to man, at the summit of the animated world.

But, as knowledge advanced, this conception ceased to be tenable in the crude form in which it was first put forward. Taking into account existing animals and plants alone, it became obvious that they fell into groups which were more or less sharply separated from one another; and, moreover, that even the species of a genus can hardly ever be arranged in linear series. Their natural resemblances and differences are only to be expressed by disposing them as if they were branches springing from a common hypothetical center.

Lamarck, while affirming the verbal proposition that animals form a single series, was forced by his vast acquaintance with the details of zoölogy to limit the assertion to such a series as may be formed out of the abstractions constituted by the common characters of each group.

Cuvier on anatomical, and Von Baer on embryological grounds, made the further step of proving that, even in this limited sense, animals cannot be arranged in a single series, but that there are several distinct plans of organization to be observed among them, no one of which, in its highest and most complicated modification, leads to any of the others.

The conclusions enunciated by Cuvier and Von Baer have been confirmed in principle by all subsequent research into the structure of animals and plants. But the effect of the adoption of these conclusions has been rather to substitute a new metaphor for that of Bonnet than to abolish the conception expressed by it. Instead of regarding living things as capable of arrangement in one series like the steps of a ladder, the results of modern investigation compel us to dispose them as if they were the twigs and branches of a tree. The ends of the twigs represent individuals, the smallest groups of twigs species, larger groups genera, and so on, until we arrive at the source of all these ramifications of the main branch, which is represented by a common plan of structure. At the present moment, it is impossible to draw up any definition, based on broad anatomical or developmental characters, by which any one of Cuvier's great groups shall be separated from all the rest. On the contrary, the lower members of each tend to converge toward the lower members of all the others. The same may be said of the vegetable world. The apparently clear distinction between flowering and flowerless plants has been broken down by the series of gradations between the two exhibited by the *Lycopodiaceæ*, *Rhizocarpeæ*, and *Gymnospermeæ*. The groups of *Fungi*, *Licheneæ*, and *Algæ* have completely run into one another, and, when the lowest forms of each are

alone considered, even the animal and vegetable kingdoms cease to have a definite frontier.

If it is permissible to speak of the relations of living forms to one another metaphorically, the similitude chosen must undoubtedly be that of a common root, whence two main trunks, one representing the vegetable and one the animal world, spring; and, each dividing into a few main branches, these subdivide into multitudes of branchlets, and these into smaller groups of twigs.

*Evolution in Philosophy.*—The modern biological doctrine of evolution, which regards the higher forms of life as gradually arising out of the lower, owes its chief philosophic significance to the fact that it renders definite and precise one part of a general theory of the world viewed as an orderly succession of events or as a process of becoming. This theory is put forward as an answer to one of the two problems of philosophy conceived as an interpretation of real existence. The first of these problems concerns itself with what may be called the statical aspect of the world, and inquires into the ultimate nature of all reality (matter and mind), viewed as coexistent and apart from time. The second problem treats of the dynamical aspect of the world, and has to do with the process by which the totality of things has come to be what it is, and is still being transformed. It is this latter problem which the various theories of evolution seek to solve.

The most general meaning of evolution may be defined as follows: Evolution includes all theories respecting the origin and order of the world which regard the higher or more complex forms of existence as following and depending on the lower and simple forms, which represent the course of the world as a gradual transition from the indeterminate to the determinate, from the uniform to the varied, and which assume the cause of this process to be immanent in the world itself that is thus transformed. All theories of evolution, properly so called, regard the physical world as a gradual progress from the simple to the complex, look upon the development of organic life as conditioned by that of the inorganic world, and view the course of mental life both of the individual and of the race as correlated with a material process. This definition covers roughly the principal historical systems bearing the name of evolution, as well as others which have hardly as yet been characterized by this title.

It is clear by this definition that we cannot now press the etymological force of the word. Evolution has no doubt often been conceived as an unfolding of something already contained in the original, and this view is still commonly applied to organic evolution both of the individual and of the species. It will be found that certain metaphysical systems of evolution imply this idea of an unfolding of something existing in germ or at least potentially in the antecedent. On the other hand, the modern doctrine of evolution, with its ideas of elements which combine, and of causation as transformation of energy, does not necessarily imply this notion. It may be remarked that some of the arguments brought against the modern doctrine rest on the fallacious assumption that the word is still used in its etymological sense, and that consequently that which evolves must contain in some shape what is evolved (*e.g.*, inorganic matter must contain life and consciousness).

Evolution is thus almost synonymous with progress, though the latter term is usually confined to processes of development in the moral as distinguished from the physical world. Further, this idea, as Mr. Spencer remarks, has rather a subjective than an objective source, since it points to an increased *value* in existence as judged by our feelings. At the same time, inasmuch as conscious and more particularly human life is looked on



by the evolutionist as the highest phase of all development, and since man's development is said to be an increase in well-being and happiness, we do not greatly err when we speak of evolution as a transition from the lower to the higher, from the worse to the better. Another respect in which the whole process of evolution may be said to be a progress is in its relation to our perceptions as æsthetic spectators, the higher phases of the process being the more varied, the fuller, and the more perfect. Apart from these subjective estimates, evolution is first of all as a whole a progress from the lower to the higher, in the sense that it is a substitution of a complex for a simple type of existence; and it is such a progress, secondly, in the narrow sense of organic development if not in the wider sense of cosmic development, inasmuch as all advance implies a larger measure of adaptation and so of permanence.

The hypothesis of evolution aims at answering a number of questions respecting the becoming or genesis of things. Of these the first is the problem of explaining change, that is to say, of accounting for that incessant process of transformation which the world manifests. The form which this question has commonly taken is, "What is motion, and how does it arise?" The second inquiry relates to the factor of intelligible order in the world, to the existence of general classes of things, including minds, of universal laws, and finally to that appearance of a rational end toward which things tend. Thirdly, it is necessary to account for the origin of organic beings which appear to be subordinated to different principles from those which control inorganic bodies. These are the principal inquiries which the various theories of evolution aim more or less completely at answering. As a subordinate question, we may mention the meaning of human history, and its relation to physical processes.

In seeking to answer these questions, the hypothesis of an evolution of the cosmos with all that it contains competes, in part at least, with two other principal doctrines respecting the origin of the world. These are the theory of direct creation by a personal Deity and that of emanation.

It is clear that the doctrine of evolution is directly antagonistic to that of creation. Just as the biological doctrine of the transmutation of species is opposed to that of special creations, so the idea of evolution as applied to the formation of the world as a whole, is opposed to that of a direct creative volition. It substitutes within the ground which it covers the idea of a natural and necessary process for that of an arbitrary volitional process.

The theory of a personal Creator answers the questions enumerated above by referring the form of the world to an act of direct creation. As an extreme doctrine, it views matter as well as form as the product of divine volition; in a modified form, it conceives the Deity as simply fashioning the uncreated material of the world; and in a still more restricted form, it regards the universal laws or forms which are impressed on things as co-eternal with the Deity. Advancing knowledge has gradually limited the sphere of direct creative activity, by referring the present order of the world to the action of secondary causes. Hence this theory only now competes with the hypothesis of evolution at one or two points, more especially the production of living forms, the origin of the human mind, and the nature of history—which last is conceived as somehow controlled by divine action in the shape of Providence. The question how far the doctrine of evolution, in its most extended and elaborate form, absolutely excludes the idea of creative activity need not be dwelt on here. It is sufficient to say that the theory of

evolution, by assuming an intelligible and adequate principle of change, simply eliminates the notion of creation from those regions of existence to which it is applied.

The doctrine of emanation, which had its origin in the East, and was developed by the Neoplatonists, Gnostics, and Cabalists, is a philosophic transformation of the idea of an original creation of the world. It regards the world as a product of the divine nature, and so far it is a theory of creation. On the other hand, it conceives of this production as necessary, and analogous rather to a physical than to a moral action. In this respect it agrees with the doctrine of evolution. It further coincides with this doctrine in the recognition of a scale of existence. It differs from this last inasmuch as it reverses the order of evolution, by making the original stage the most perfect and all later stages a succession of degradations. Let us now see how the doctrine of evolution deals with the problems of becoming as above defined. And here it becomes necessary to distinguish between different ways of formulating and interpreting the idea of evolution. The various modes of conceiving and interpreting the idea of a natural evolution of things depend on the answers given to three principal questions respecting the nature and causes of the process. These are:—How far is the process a real objective one? What is the nature of that reality which makes the content, so to speak, of the process of evolution? and, How is the process effected?

First of all, very different views may be taken of the reality of the process of becoming, generation, and transformation. On the one side we have the extreme view of the Eleatics, that there is no such thing as change or individual object, that real being is one and unchangeable, and that what appears like the formation and destruction of things is an illusion of the senses. At the other extreme we have the view that all reality consists in the process of becoming, or self-realization, and that nothing persists save this law of evolution itself. Between these two extremes there lie a number of intermediate conceptions, as that of a varying and progressive activity, of a persistent force, or of a gradual manifestation of an unchanging substance. The reality of the process is viewed in a peculiar light from the standpoint of modern Subjective Idealism, which regards time as nothing but a mental form. It is to be added that the process of cosmic evolution may present different degrees of reality. Thus to the ancient atomists the real part of the process is the combination of atoms. There is no absolute generation or destruction of things. Further, the evolution of the world of sensible qualities (color, etc.) of things, is illusory, and has only a subjective existence in our sensations. The modern scientific doctrine of evolution carries out this view of its reality, both by its conception of the material world as objectively real only in its forces and movements, and by its doctrine of the conservation of energy, which teaches that amid all change and transformation there is something (though not necessarily a metaphysical thing) which persists.

Secondly, the view of evolution will vary according to the conception of that substance or real thing which enters into the process and constitutes its essential content. We have said that the problems of being and becoming are distinct, yet they cannot be discussed in perfect isolation. More particularly our idea of becoming must be determined by our notion of that existing reality which underlies the process.

It follows from our definition of evolution that its main problem is to conceive of material and mental development in their mutual relation. There are various ways of effecting this result. First of all, the material and



the mental may be regarded from a dualistic point of view as perfectly distinct kinds of reality. According to this view, physical evolution as taking place in the inorganic world, and mental evolution as unfolded in man's history, are two unconnected processes. Further, the fact of their correlation in organic development must either be left unexplained altogether, or can only be referred to the arbitrary action of some supernatural power.

Opposed to this dualistic conception of reality there are the monistic conceptions, which conceive of all parts of the process of evolution as homogeneous and identical. Of these the first is the materialistic, which assumes but one substance, and regards mind as but a property or particular manifestation of matter. On this view mental evolution is simply one phase of material, and the whole course of cosmic evolution may be described as a production of mind out of matter.

The next monistic conception is the spiritualistic, which assumes but one substance—mind, and resolves the reality of the material world into a spiritual principle. According to this way of looking at the world-process, material and mental evolution are but two continuous phases of one spiritual movement. From the operation of inanimate nature up to human history it is the same spiritual reality which manifests itself.

Finally, there is the monistic conception in the narrow modern sense, viz., that which views the material and the mental as two sides of one and the same reality. According to this view, physical evolution as manifested in the material world, and mental evolution as seen in human life, may each be regarded as a two-sided process. The first is simply that part of the process in which the material side is most conspicuous; the second, that in which the mental side is so. This monistic conception shows itself in a number of forms—from the crude semi-mythological conception of a cosmic organism or world-animal, which is at once body and soul, up to the metaphysical doctrine of one substance with two attributes.

In the third place, the form of the doctrine of evolution will vary according to the conception of the force or activity which effects the process. This point, though closely related to the last, is not identical with it. It is one thing to understand *what* it is that evolves itself, another thing to comprehend *how* the process is brought about. The latter point is of even greater importance for studying the various theories of evolution than the former.

There are two strongly contrasted modes of viewing all action or change. The first is drawn from the region of physical events, and views the change as conditioned by antecedents or efficient causes. This way of looking at change gives the mechanical view of evolution. The second is drawn from the region of our conscious volitions regarded as themselves undetermined by antecedent causes, and conceives of change as related to and determined by some end or purpose. This gives the teleological view of evolution. Although there is a natural affinity between the mechanical and the materialistic conception of evolution on the one side, and between the teleological and the spiritualistic on the other, they are not exactly co-extensive. The teleological view does no doubt imply the acceptance of a spiritual or quasi-spiritual principle; it refers the form and order of the world to the action of an intelligence (conscious or unconscious) which combines particular events as means to some comprehensive end. The mechanical view, on the other hand, does not necessarily imply the acceptance of a material principle as the one reality. It is applicable to mind as well as to body. Thus, on the determinist theory, mental development is as much a mechanical process as physical development.

Adopting this distinction between the mechanical and teleological conception of evolution as the essential one, we may roughly classify the various systems of evolution under the three heads:—those in which the mechanical view predominates; those in which the teleological view predominates; and those in which the two views are combined in some larger conception.

The mechanical interpretation may first of all be combined with a dualistic theory. Such would be Descartes' doctrine of evolution if it had been fully worked out on its mental side. It has been observed, however, that the mechanical view is naturally allied to the materialistic theory. Systems of evolution which arise out of this combination seek to resolve all appearance of order and purpose in the physical world into the combined effect of elementary forces or actions. They adopt a mechanical conception of organic bodies and their processes. Finally, they regard mental life and its evolution as a process of combination exactly analogous to that of physical evolution and closely correlated with a certain mode of this process. In this way they lead to a materialistic conception of man's origin and development as conditioned by physical circumstances and organic changes.

This thorough-going materialistic way of viewing the origin and formation of the world finds its greatest obstacle in the genesis of conscious life. Hence it has from the earliest been modified in one or two ways so as to provide a primordial source of sensation and thought, without, however, abandoning a strictly mechanical view of the process. The first and crude form in which this modification presents itself is that of an original, thin, quasi-material substance (as ether), which may serve as the raw material, so to speak, of individual minds. The formation of these minds, however, is regarded as a strictly mechanical process, and related to that of physical evolution in the narrow sense. This theory of the origin of mental existence clearly approaches one of the forms of the doctrine emanation already referred to. We have only to conceive of the primordial mental substance as the infinite being, transcending our finite world, and the doctrine becomes one of emanation. The second modification of this view consists in the theory that all parts of matter are endowed with sensibility, but that the sensations are not themselves (as teleological factors) the productive force in the process, but are rather the appendages of the real factors. The world forms itself according to strictly mechanical laws of combination, and the evolution of the various grades of mind in the organic region takes place by a composition of elementary feelings exactly similar to the process of material combination.

Before leaving the systems which are based on the mechanical view, a bare allusion must be made to a recent suggestion that all things consist ultimately of mental substance ("mind-stuff"), which combines itself both in the material world and in the region of conscious mind according to strictly mechanical principles.

The second mode of viewing the process of evolution subordinates the idea of physical cause to that of final cause. The force which effects the continual production and transformation of things is conceived of, more or less distinctly, after the analogy of a rational impulse toward an end, and the process is regarded as determined or conditioned by this element of purpose.

This teleological view of evolution may be found in a number of systems of nature, which look on the material world as at once bodily and vital, or spiritual, though it is often difficult to say whether any particular system should be called dualistic or monistic (in the narrow sense). Thus, we have the evolution of the physical world referred to a vital principle which pervades all



matter, and of which the essential nature is productivity, to a formative plastic principle, which molds the dead material into various shapes, to an organizing cosmic force, and so on. In all these conceptions, which appear to aim more especially at an explanation of organic forms and life, the element of purpose appears in a nascent shape. Nature is personified as a worker, who aims, unconsciously and instinctively, at some dimly described end, such as the most varied production, the progressive manifestation of life, and so on. In some of these systems, notably in the Aristotelian, the genesis of conscious mind is explained, along with that of organic life, by means of the supposition, that mind is but the formative principle of the individual organism.

The idea of purpose becomes more definite, and, at the same time, a further step is taken toward the explanation of mental life, as a development out of physical, in those systems which project a distinct spiritual principle into nature. The way in which this is frequently done, is by means of the theory of a world-soul, which animates the whole of the material world, and directs all parts of its evolution. When this spiritual principle is regarded, not only as the formative force, but also as the substantial source of conscious mental life, which has eternally coexisted with matter, we have, as already remarked, a pantheistic conception of evolution, which, like another and cognate conception, already referred to, approximates to one form of the emanation theory.

The full development of this way of regarding the world and its evolution as the work of a spiritual principle aiming toward an end is to be found in certain doctrines of Objective Idealism, which resolve all material existence into a mode of mental existence—will and thought. These theories clearly simplify the conception of evolution to the utmost, by the identification both of the substantial reality which enters into all parts of the world-process, and of the rationale of all parts of the process itself. In the systems now referred to, the mechanical idea is wholly taken up into the teleological. Purpose is the highest law of things, and it is one purpose which manifests itself through all stages of the world's evolution—in the region of inorganic nature, of organic life, and of human history. The first genesis of conscious life is explained as a particular moment in this process. In some spiritualistic systems an attempt is made to combine the mechanical (causal) and teleological ideas under the notion of logic development. Yet as a rule the teleological way of conceiving the process predominates.

The systems which seek to combine the teleological and the mechanical view of evolution are for the most part based on the monistic idea that the material and the mental are two equally real aspects of one thing. It is clear that this conception of reality provides a way of doing justice to both modes of looking at evolution. In this manner the systems now spoken of are able to regard all parts of evolution as identical in nature, being alike links in a chain of purposeful effects.

This way of regarding the world in its process of evolution will vary according to the particular view of the one reality underlying material and mental phenomena. Thus we may have a universalistic conception of evolution as the two-sided activity of one undivided substance. This idea passes easily into a pantheistic view of the world-process as determined by a divine reason which is also the principle of necessity. In the second place, we may have an individualistic conception of this two-sided process, according to which the world arises out of the unceasing activity of an indefinite number of elements endowed with motion and sensation, and so comprehending a mechanical and a teleological factor.

It has already been remarked, however, that this conception may be combined with a strictly mechanical view of evolution.

The doctrine of evolution in its finished and definite form is a modern product. It required for its formation an amount of scientific knowledge which could only be very gradually acquired. It is vain, therefore, to look for clearly defined and systematic presentations of the idea among ancient writers. On the other hand, nearly all systems of philosophy have discussed the problems underlying evolution. Such questions as the origin of the cosmos as a whole, the production of organic beings and of conscious minds, and the meaning of the observable grades of creation, have from the dawn of speculation occupied men's minds; and the answers to these questions often imply a vague recognition of the idea of a gradual evolution of things.

The honor of working out the theory of evolution on a substantial basis of fact belongs to England. Of the writers who have achieved this result Mr. Darwin deserves the first notice. Though modestly confining himself to the problem of accounting for the evolution of the higher organic forms out of the lower, Mr. Darwin has done much to further the idea of a gradual evolution of the physical world. The philosophic significance of the hypothesis of natural selection, especially associated with Mr. Darwin, is due, as Professor Helmholtz points out, to the fact that it introduces a strictly mechanical conception in order to account for those intricate arrangements known as organic adaptations which had before been conceived only in a teleological manner. By viewing adaptations as conditions of self-preservation, Mr. Darwin is able to explain how it is that the seemingly purposeful abounds in organic nature. In so doing he has done much to eliminate the teleological method from biology. It is true that, in his conception of seemingly spontaneous variations and of correlation of growth, he leaves room for the old manner of viewing organic developments as controlled by some internal organizing principle. Yet his theory, as a whole, is clearly a heavy blow to the teleological method. Again, Mr. Darwin has greatly extended the scope of mechanical interpretation, by making intelligible, apart from the coöperation of intelligent purpose, the genesis of the organic world as a harmonious system of distinct groups, a unity in variety, having certain well-marked typical affinities. How greatly this arrangement has helped to support the idea of an ideal plan, we have had occasion to observe. Mr. Darwin in his doctrine of the organic world as a survival refers this appearance of systematic plan to perfectly natural causes, and in so doing he gives new meaning to the ancient theory that the harmony of the world arises out of discord. Once more, Mr. Darwin's hypothesis is of wide philosophic interest, since it helps to support the idea of a perfect gradation in the progress of things. The variations which he postulates are slight, if not infinitesimal, and only effect a sensible functional or morphological change after they have been frequently repeated and accumulated by heredity.

Mr. Darwin's later work, in which he applies his theory of the origin of species to man, is a valuable contribution to a naturalistic conception of human development. The mind of man in its lowest stages of development is here brought into close juxtaposition to the animal mind, and the upward progress of man is viewed as effected by natural causes, chief among which is the action of natural selection. Mr. Darwin does not inquire into the exact way in which the mental and the bodily are connected. He simply assumes that, just as the bodily organism is capable of varying in an indefinite number of ways, so may the mental faculties vary in-



definitely in correspondence with certain physical changes. In this way he seeks to account for all the higher mental powers, as the use of language and reason, the sentiment of beauty, and conscience.

Finally, Mr. Darwin seeks to give a practical and ethical turn to his doctrine. He appears to make the end of evolution the conscious end of man's action, since he defines the general good as "the rearing of the greatest number of individuals in full health and vigor, and with all their faculties perfect under the conditions to which they are subject." Further, in his view of the future of the race, Mr. Darwin leans to the idea that the natural process which has effected man's first progress must continue to be an important factor in evolution, and that, consequently, it is not well to check the scope of this process by undue restraints of population, and a charitable preservation of the incompetent.

Mr. A. R. Wallace, who shares with Mr. Darwin the honor of establishing the doctrine of natural selection, differs from the latter in setting much narrower limits to the action of this cause in the mental as well as the physical domain. Thus he would mark off the human faculty of making abstractions, such as space and time, as powers which could not have been evolved in this way. Mr. Wallace leans to the teleological idea of some superior principle which has guided man in his upward path, as well as controlled the whole process of organic evolution. This law is connected with the absolute origin of life and organization.

The thinker who has done more than anyone else to elaborate a consistent philosophy of evolution on a scientific basis is Mr. Herbert Spencer. First of all he seeks to give greater precision to the conception of this universal process. Evolution is a change from the homogeneous to the heterogeneous, from the indefinite or undetermined to the definite or determined, from the incoherent to the coherent. Again, Mr. Spencer seeks to show that the causes of evolution are involved in the ultimate laws of matter, force, and motion, among which he gives great prominence to the modern doctrine of the conservation of energy. Thus the rationale of the process shapes itself to Mr. Spencer as a distinctly mechanical problem. He sets out with the assumption of a limited mass of homogenous matter acted upon by incident forces, and seeks to show how, by help of two laws — namely, the instability of the homogeneous, and the multiplication of the effects of any such incident force — the process known as evolution is brought about. This process is illustrated in the genesis of the solar system, for the explanation of which Mr. Spencer makes use of the nebular hypothesis, in the formation of our planet, as well as the development of organic and mental life. Mr. Spencer does not, however, conceive of this process of evolution as unlimited in time. As in the development of the individual organism, so in that of organic beings as a whole, of the earth, and of the solar system, there is a conflict between the forces of which the action is integrating or consolidating and those of which the action is disintegrating. The process of evolution always tends to an equilibration between these conflicting forces and ultimately to a dissolution of the products of evolution. Thus the solar system is a moving equilibrium which is destined to be finally dissipated into the attenuated matter out of which it arose. Mr. Spencer thus approaches the earliest theories of cosmic evolution when he tells us that vast periods in which the forces of attraction prevail over those of repulsion, alternate with other vast periods in which the reverse relation holds. The mechanical theory of evolution thus laid down in the *First Principles* is applied in Mr. Spencer's later works to the full explanation of organic, mental, and social evolution.

The full explanation of the processes of inorganic evolution finds no place in the writer's system. Mr. Spencer seeks, in the *Principles of Biology*, to conceive of organic bodies and their actions in mechanical terms. Life is regarded as essentially a correspondence of internal actions in the organism to external actions proceeding from the environment, and the object of Mr. Spencer's volumes is to explain on mechanical principles the growth of this correspondence from the lowest to the highest. He excludes all consideration of the question how life first arose, though it is clear that he regards the lowest forms of life as continuous in their essential nature with sub-vital processes.

It is in the later volumes dealing with mental and social evolution, that Mr. Spencer's exposition becomes most interesting to the student of philosophy. In the *Principles of Psychology*, he seeks to deal with mind as an aspect or correlate of life which begins to manifest itself when the process of adjustment to environment, in which all life consists, reaches a certain degree of complexity. Mr. Spencer indulges in no hypothesis respecting the universal coexistence of sentience with matter and force. He thinks we must accept the distinctions which common-sense has established, and so limit feeling or consciousness to organic beings endowed with a nervous system. Thus, just as he does not seek to explain the first appearance of life as a whole, so he does not seek to explain the first dawn of mental life. Mr. Spencer's unit of consciousness is the blurred undetermined feeling which answers to a single nervous pulsation or shock. Assuming this he seeks to trace the gradual evolution of consciousness. Sensations arise by a number of rapid successions of such elementary feelings variously combined, and all more composite states of mind arise by a similar process of combination of these feelings. Thus mental evolution is a progressive composition of units of feeling in more and more complex forms, and united by more complex relations. Mr. Spencer's conception of mind thus excludes all fundamental distinctions of faculty. Instinct, memory, reason, the emotions and volitions, alike develop themselves in divergent directions out of a common elementary process. They are, moreover, all related to one and the same biological process, being incidental accompaniments of the actions by which the organism responds and adjusts itself to the forms of its environment. According as these actions are more complex, and consequently less immediate, the mental actions which accompany them vary in character from reflex action up to deliberate volition, from the most simple presentative feeling or sensation up to the most complex representative and re-representative feeling or emotion. It would be impossible to point to all the applications which Mr. Spencer has made of his principle of evolution to the questions of psychology. We may just mention among other points of interest his attempt to explain the innate intuitions of space, moral right, etc., as mental dispositions handed down from progenitors and embodying the uniform experience of many generations, his ingenious endeavor to account for the coincidence between pleasures and pains and actions beneficial and injurious to the organism, and his conception of the æsthetic interest as a growth out of the play-impulse, which is the tendency of activities that have become developed beyond the immediate needs of existence to vent themselves.

To Mr. Spencer, as to Mr. Darwin, the doctrine of evolution seems to supply the end of conduct. He conceives of morality as essentially an observance of the laws of life, the individual and the collective. At the same time, since Mr. Spencer regards the moral sense as a growth out of feelings of pleasure and pain



(racial experiences), closely identifies the ends of life and happiness, and distinctly teaches that social evolution or progress makes for an increase of happiness, his ethical doctrine does not materially differ from that of utilitarianism.

As a scientific doctrine, whatever its ultimate interpretation, evolution has a bearing on our practical, *i. e.*, moral and religious ideas. Among other results, this doctrine may be said to give new form to the determinist theory of volition, and to establish the relativity of all moral ideas as connected with particular stages of social development.

The bearing of the doctrine of evolution on religious ideas is not easy to define. Mr. Spencer considers the ideas of evolution and of a preëxisting mind incapable of being united in thought. Yet, according to others, the idea is by no means incompatible with the notion of an original Creator, though it serves undoubtedly to remove the action of such a being further from our ken. At first sight it might appear that the doctrine as applied to the subjective world, by removing the broad distinction between the human and the animal mind, would discourage the hope of a future life for man's soul. Yet it may be found, after all, that it leaves the question very much where it was. It may perhaps be said that it favors the old disposition to attribute immortality to those lower forms of mind with which the human mind is found to be continuous. Yet there is nothing inconsistent in the supposition that a certain stage of mental development qualifies a mind for immortality, even though this stage has been reached by a very gradual process of development. And if, as might be shown, the modern doctrine of evolution is susceptible of being translated into terms of Leibnitz's hypothesis of indestructible monads, which include all grades of souls, then it is clearly not contradictory of the idea of immortality.

EVORA, a city of Portugal, capital of the province of Alemtejo, is situated on an eminence in the center of a fertile plain, eighty-five miles east by south of Lisbon.

EVREUX, a town of France, capital of the department of Eure, is situated on the Iton, an affluent of the Eure, sixty-seven miles west-northwest of Paris by railway.

EWALD, HEINRICH GEORG AUGUST VON, Orientalist, biblicist, and theologian, was born, November 16, 1803, at Göttingen, where his father followed the occupation of a linen-weaver. After receiving the usual preliminary training, he entered the university of his native town in 1820; and there, with Eichhorn as teacher, he at once began to devote himself specially to the study of Hebrew and its cognates. At the close of his academical career, in 1823, he was appointed to a mastership in the gymnasium at Wolfenbüttel; but soon afterward (in the spring of 1824) he was, at the instance of Eichhorn, recalled to Göttingen as repentant, or theological tutor, and in 1827 (the year of Eichhorn's death) he became professor *extraordinarius* in philosophy, and lecturer in Old Testament exegesis. In 1831 he was promoted to the position of professor *ordinarius* in philosophy; and in 1835 he entered the faculty of theology, taking the chair of Oriental languages. Two years later occurred the first important episode in his studious life, which until then had been uninterrupted in its even tenor except by journeys in 1826, 1829, and 1836, to Berlin, Paris, and Italy, for the purpose of consulting rare and important oriental manuscripts. In 1837, on November 18th, along with six of his colleagues (Dahlmann the historian, Weber the electrician, Gervinus the critic, the brothers Grimm, and W. E. Albrecht) he signed a formal protest against the arbitrary proceeding of King

Ernst August (Duke of Cumberland) in abolishing the liberal constitution of 1833, which had been granted to the Hanoverians by his predecessor, William IV. This bold action of the seven professors made them very popular and famous in the country; but it led to their speedy expulsion from the university (December 14th). Early in 1838 Ewald received a call to Tübingen, and there for upward of ten years he held a chair as professor *ordinarius*, first in philosophy and afterward, from 1841, in theology. To this period belong some of his most important works, and also the commencement of his bitter feud with F. C. Baur and the Tübingen critical school. In 1848, "the great shipwreck-year in Germany," as he has called it, he was invited back to Göttingen on honorable terms — the liberal constitution having been restored. He gladly accepted the invitation, for though well treated in Würtemberg (he had been ennobled by the king in 1841), he had never learned to regard his sojourn there as anything else than a period of exile. In 1862–63 he took an active part in a movement for reform within the Hanoverian church, and he was a member of the synod which passed the new constitution. He had an important share also in the formation of the *Protestantenverein*, or Protestant association, in September, 1863. But the chief crisis of his life arose out of the great political events of 1866. His loyalty to King George (son of Ernst August) would not permit him to take the oath of allegiance to the victorious king of Prussia, and in consequence of his refusal to do so he was ultimately placed on the retired list, though with the full amount of his salary as pension. Perhaps even this degree of severity might have been held by the Prussian authorities to be unnecessary, had Ewald been less exasperating in his language. The violent tone of some of his printed manifestoes about this time, especially of his *Lob des Königs u. des Volkes*, led to his being deprived of the *venia legendi* (1868), and also to a criminal process, which, however, resulted in his acquittal (May, 1869). Then, and on two subsequent occasions, he was returned by the city of Hanover as a member of the North German and German parliaments. In June, 1874, he was found guilty of a libel on Prince Bismarck, whom he had compared to Frederick II. and Napoleon III. — to the former in "his unrighteous war with Austria and his ruination of religion and morality," to the latter in his way of "picking out the best time possible for robbery and plunder." For this offense he was sentenced to undergo three weeks' imprisonment. He died in his seventy-second year, of heart-disease, May 4, 1875.

EWALD, JOHANNES, the greatest lyrical poet of Denmark, was the son of a melancholy and sickly chaplain at Copenhagen, where he was born on November 18, 1743. At the age of eleven he was sent to school at Schleswig, his father's birth-place, and returned to the capital only to enter the university in 1758. His father was by that time dead, and in his mother, a frivolous and foolish woman, he found neither sympathy nor moral support. At fifteen, he fell passionately in love with "the delicate, noble, majestic Arense," a girl whose father, later on, married the poet's mother; and the romantic boy resolved on various modes of making himself admired by the young lady. He began to learn Abyssinian, for the purpose of going out as a missionary to Africa, but this scheme was soon given up, and he persuaded a brother, four years older than himself, to run away that they might enlist as hussars in the Prussian army. They managed to reach Hamburg just when the Seven Years' War was commencing, and were allowed to enter a regiment. But the elder brother soon got tired and ran away, while the poet, after a series of extraordinary adventures, deserted to the Austrian army,



where from being drummer he rose to being sergeant, and was only not made officer because he was a Protestant. In 1760 he was weary of a soldier's life, and deserted again, getting safe back to Denmark. For the next two years he worked with great diligence at the university, but the Areense for whom he had gone through so much hardship and taken so much pains married another man almost immediately after Ewald's final and very successful examination. The disappointment was one from which he never recovered. He plunged into dissipation of every kind, and gave his serious thoughts only to poetry. In 1763 his first work, a perfunctory dissertation *De Pyrologia Sacra*, first saw the light. In 1764 he made a considerable success with a short prose story, *The Temple of Fortune*, which was translated into German and Icelandic. On the death of Frederick V., however, Ewald first appeared prominently as a poet; he published in 1766 three *Elegies* over the dead king, which were received with universal acclamation, and of which one, at least, is a veritable masterpiece. But his dramatic poem *Adam and Eve*, by far the finest imaginative work produced in Denmark up to that time, was rejected by the Society of Arts in 1767, and was not published until 1769. At the latter date, however, its merits were perceived. In 1770 Ewald attained success with *Philet*, a narrative and lyrical poem, and still more with his splendid *Rolf Krage*, the first original Danish tragedy. For the next ten years Ewald was occupied in producing one brilliant poetical work after another, in rapid succession. In 1771 he published *The Brutal Clappers*, a tragi-comedy or parody satirizing the dispute then raging between the critics and the manager of the Royal Theatre; in 1772 he translated from the German the lyrical drama of *Philemon and Baucis*, and brought out his comedy of *Harlequin Patriot*, a satire on the passion for political scribbling created by Struensee's introduction of the liberty of the press. In 1773 he published *Old Bachelors*, a comedy. In 1771 he had already collected some of his lyrical poems under the title of *Miscellanies*. In 1774 appeared the heroic opera of *Balder's Death*, and in 1779 the finest of his works, the lyrical drama *The Fishers*, which contains the Danish national song, *King Christian stood by the high Mast*, his most famous lyric. In the two poems last mentioned, however, Ewald passed beyond contemporary taste, and these great works, the pride of Danish literature, were coldly received.

But while the new poetry was slowly winning its way into popular esteem, the poet did not lack admirers, and at the head of these he founded in 1775 the Danish Literary Society, a body which became influential, and which made the study of Ewald a cultus. But the poet's health had broken; when he was writing *Rolf Krage* he was already an inmate of the Consumptive Hospital, and when he seemed to be recovering, his health was again shattered by a night spent in the frosty streets. He embittered his existence by the recklessness of his private life, and finally, through a fall from a horse, he ended by becoming a complete invalid. His last ten years were full of acute suffering; his mother treated him with cruelty, his family with neglect, and but few even of his friends showed any manliness or generosity toward him. In 1774 he was placed in the house of an inspector of fisheries at Rungsted, where Anna Hedevig Jacobsen, the daughter of the house, tended the wasted poet with infinite tenderness and skill. He stayed in this house for three years, and wrote there some of his finest later lyrics. Meanwhile he had fallen deeply in love with the charming solace of his sufferings, and won her consent to a marriage. This step, however, was prevented by his family, who roughly removed him to their own keeping near Kron-

borg. Here he was treated so infamously that he insisted on being taken back to Copenhagen in 1777, where he found an older, but no less tender nurse, in Madame Schouw. Here he wrote *The Fishers*, with his imagination full of the familiar shore at Hornbæk, near Rungsted. In 1780 he was a little better, and managed to be present at the theater at the first performance of his poem. But this excitement destroyed him, and after months of extreme agony, he died on March 17, 1781, and was carried to the grave by a large assembly of his admirers, since he was now just recognized by the public for the first time as the greatest national poet.

EWING, ALEXANDER (1814-1873), a clergyman of the Scotch Episcopal Church, Bishop of Argyll and the Isles.

EXAMINATIONS. Examinations have lately come very widely into use, and call for consideration at once as educational appliances and as tests of proficiency. Something answering to examinations must enter into all effectual instruction; for, in order that the pupil may gain solid advantage, it is not enough that what he ought to know should be put before him—as by giving him a book, or by making him listen to lectures—but we must also see that he gets hold of it and understands it aright; this is the functions of examinations as appliances for education. They have, however, another use, that of tests or instruments for selection, and this purpose may clash with the educational purpose. But, though the examiners may have one purpose primarily in view, and may lay down their scheme with especial reference to it, we must bear in mind that the examination must act in both ways at once. Some sort of advantage must attend on success, or else candidates will not work for it, and, on the other hand, though an examination may only be intended to sift out the ablest, and pains may be taken to avoid giving any advantage to a particular sort of instruction, still it will be found that some particular course is most productive of marks, and this will come into favor.

The few notices which we find of examinations in old times relate to tests of qualification for professions or crafts. We gather from notices of contests between the universities and the medical corporations in London, that students had to pass an examination, after going through their apprenticeship, before being allowed to practice. But we never find that an examination was the sole test; it was always attached to a prescribed course of study and service. The foundation deeds of old endowed schools sometimes contain a provision for an examination; the object of this seems to have been rather to ascertain that the teaching was satisfactory than to classify the boys, though sometimes prizes and emoluments were awarded by the examiners.

University examinations are found to take their origin from the "disputations" which appear very early in the history of universities. Dialectical discussion had entered largely into the higher education in classical times, and when the university of Bologna was incorporated as a school of law by the emperor Frederick I., in 1158, disputations soon came into use as exercises for degrees. The university of Paris, which was founded soon after, and which was a school of theology and of arts, adopted the same course; and the forms of these exercises for degrees have survived to the present time in Germany, and did not disappear in England until 1860.

A student who aimed at a degree, which formerly only the more distinguished did, acted three times as opponent to other candidates, and was in time admitted to keep his "Act." This performance began by his reading a Latin thesis, in which he maintained some position in disputation against a doctor in the faculty, as well as the



above-named opponents, and, in fact, against all comers. The debate was carried on in syllogistic form; the presiding doctor eventually summed up the controversy, and usually passed a compliment on the disputant, which was the earliest form of university honors.

Academical degrees, in their origin, implied a title to teach, as is seen in the names of Doctor and Master. The notion of a university degree as a criterion of general cultivation is comparatively recent: the B.A. or first degree, which is now so important, was not known in the earliest times, and is not even now granted in the German universities. The disputations took wonderful hold of the popular mind in the Middle Ages. It may be supposed that students looked more to points that gave an opening for attack, or that might be ingeniously defended, than to the truth of the matter; and as the question would be settled by an appeal to the Bible or Aristotle, a habit of looking to authority was engendered. We may catch sight of analogous evils in the examination system; for under this the points that are most likely to yield questions are the most studied. The two plans are only different ways in which the student may make a display of the powers or the knowledge he has acquired. We may observe that disputations bring out "powers," such as ease of expression in Latin, quickness in logical fence, and fertility of resource, more thoroughly than they do actual knowledge; they are better adapted for "Arts" than for sciences.

Each member of the "faculty" had a right of putting questions to the candidate for admission into it in addition to that of formally opposing him in his "Act," and this was freely exercised. This was the germ of the examination, which has since developed itself in England, and displaced the disputation.

Examinations are effective in three principal ways as regards education. First, they act as stimulants, partly by holding out the prospect of advantages of some sort, and partly by appealing to the combative spirit in human nature and the desire to excel. Stimulants are valuable in our pharmacopœia, though liable to be used too freely. Youths who might sink into inertness are often roused to vigor by seeing a definite object to work for, or by finding themselves engaged in a contest. On the other hand, if the idea of gain is presented to young people too early, it may over-ride all other motives, such as duty and regard for authority and desire to learn. To those who have been habituated to examinations, it seems useless to work for anything in which they are not going to be examined, and the examinations will not act as a stimulus unless something is to be got by them. Hence competitive examinations should not be often repeated; a single comprehensive one at the end of a long course may do good, but it must not be kept always immediately in view. The pupil should not himself study examination papers, or speculate on the most profitable course, but should trust to his tutor, who will tell him that the best way to get marks is to learn honestly, as if for learning's sake only. The stimulating effect of examinations leading to gain acts on parents and on school-masters. It leads parents to exert themselves to procure, not the best education for their sons they can, but the most direct preparation for competitions. This fosters low notions of education; people overlook the value of developed faculties and good mental habits, and seem to think that if there were no examinations their sons would want no schooling. Often it is of great importance for a youth to pass an examination when there is no time for him to get genuine knowledge; this knowledge must then be simulated by a process called "cram," which means that the "portative memory," or carrying power, must serve as a make-shift for all other faculties. School-masters find a zest given to their work by look-

ing to the places their pupils may gain, but the course which will earn the best place is not always that which will be the best for the youth in the end; and then the master is pulled in the wrong direction by the eagerness of the boy or his parents, and sometimes of his own subordinates, all of whom look first to success. Masters, let it be said, for the most part resist nobly, and aim at doing real good; but the pressure put on them adds to the wear and tear of their work.

Secondly examinations serve as guides. A youth may seem to be listless only because his energies have not been turned into a definite channel; when he is shown his work, and is started into the way to do it, he becomes quite another being. Besides, a good examination shows what is meant by knowing a subject. The pupil or even a teacher by looking over a thoughtfully drawn up paper of questions gets a higher standard of knowledge; he sees the way of dealing with the subject *secundum artem* as opposed to any slipshod, easy-going way of handling it. On the other hand, examination papers which are so meager that the pupil finds no call on him for intelligence, or in which he can pass by doing a very small portion of the paper, have a most injurious effect. They give the pupil a low view of knowledge, and cripple the teacher, because the pupil is confident of passing with what he thinks he can learn in a week or two before the examination.

Thirdly, examinations oblige a person to be able to produce his knowledge, and encourage him to bring it out in a terse and lucid style. They give no credit to loose or floating knowledge. Notions that are in solution are not available; they must be crystallized in definite form before an examiner will accept them. Great difference is also made between an answer which is perfect and one which is not; and this exerts a good influence, for one of the commonest defects of loosely trained minds is that they are very deficient in exactitude, and do not appreciate the enormous difference between going "somewhere near" the mark and hitting the precise point.

But examinations, even when well conducted, have ill as well as good effects. They destroy spontaneity. Nine young people out of ten may quite rightly be made to move in a good "regulation groove," but the tenth would be better for having room to expatiate. The candidate who is getting up his books is busy about learning, not in thinking. If independent thoughts suggest themselves he puts them aside; his business is with his "books," for his own thoughts cannot be set. This tendency may be obviated by allowing scope in the answers for some discursiveness (but this has its evils also) or by introducing essays, but a man's mind no doubt becomes "examination bound" if he is subjected to repeated definite mechanical examinations. He is kept in a state of pupilage, and only reads to recollect when he is of an age to reflect, to examine, and to judge.

This leads to the question of age. Examinations, though good for boys, are bad for men. Those which deal with general education should not be continued beyond the age of twenty-two. Professional examinations, or examinations in the highest part of science, intended for those who mean to give their lives to study, must come later, but should be as little competitive as possible. By a "competitive" examination is meant one in which a candidate is depressed or excluded by the superiority of another.

EXARCH (a chief person or leader), a title that has been conferred at different periods on certain chief officers or governors, both in secular and ecclesiastical matters. Of these, the most important were the exarchs of Ravenna, the first of whom was appointed by Justinian, emperor of the East, as governor of the mid-



dle part of Italy, which was made a province of the Eastern empire after Narses had entirely subdued the Goths and their allies in Italy, 552-554 A.D. Ravenna, with the whole exarchate, was conquered by Astolphus, King of the Lombards, in the year 752; but three years later it was taken by Pepin, King of the Franks, who bestowed it on the Pope (Stephen III.), from which time Ravenna and its territory remained united to the papal dominions. The exarch of a diocese was anciently the same as primate. This dignity was intermediate between the patriarchal and the metropolitan, the name patriarch being given only to the heads of the more important dioceses. Metropolitans are also sometimes called exarchs, but apparently not in a technical sense. Exarch is used, in the ecclesiastical antiquities of the Eastern Church, for a general or superior over several monasteries, and is also applied to certain ecclesiastics deputed by the Patriarch of Constantinople to collect the tribute payable by the church to the Turkish Government. In the modern Greek Church, an exarch is a deputy, or legate *a latere*, of the patriarch, whose office is to visit the clergy and churches in the provinces allotted him.

**EXCAMBION, or EXCHANGE.** Excambion (a word connected with a large class of Low Latin and Romance forms) means, in Scotch law, the exchange of one heritable subject for another. Its meaning is extended by Lord Stair to every case of exchange or barter, the *permutatio*, or innominate contract of the civil law, about which a fierce controversy raged between the Proculian and Sabinian schools, as to whether it was truly a sale or a separate contract. Both schools used to quote the words of Homer, "And thence, too, wine was got by the long-haired Archæans, some bartering it for bronze, and others the glistening steel, some hides, and some the cows themselves, and some again slaves." This Roman contract was not constituted by consent, but by a formal stipulation; it did not pass the property of movables, if the seller had not a title; and it was liable to be rescinded on proof of great inequality. In each of these features it has been modified by the modern law of most European states.

*Exchange*, in English law, is defined as the mutual grant of equal interests, the one in consideration of the other.

**EXCHANGE.** The system by which commercial nations discharge their debts to each other has been termed "Exchange," or "the Exchanges." It has been the subject of much study both by merchants and bankers who have to deal with its phenomena in the course of business, and by economists desirous to discover the causes of the phenomena, and to explain the laws or method of their operation. In rude times the people of neighboring countries brought their staple or surplus produce to common fairs, where one kind of goods was valued and bartered for another; and the dealers brought a little gold and silver with them to settle the small balances. But this, though a rough type of international trade, still is a wholly different affair from modern commerce, with its transactors multiplied a millionfold, and conducting their transactions far apart in widely distant countries. Money itself does little to obviate the difficulties arising from this multiplicity of crossing and recrossing currents; and whoever, therefore, was the first introducer of the idea of "Exchange" is entitled to a high place in the commercial annals of the world—whether it was the stranger mentioned by Isocrates, who came to Athens with some cargoes of corn, and gave an order on a town on the Euxine where money was owing to him, with recourse on an Athenian merchant in the event of the order being dishonored; or Cicero, in paying for

the studies of his son at Athens by an assignment from a creditor in Rome on his debtor in the Greek city; or the pope, whose lending merchants of Siena and Florence, drew upon Henry III., or rather on the prelates and abbots of England, with some English merchants as remitters, for the expenses of deposing Manfred, King of Sicily, in which act of deposition Henry was an interested and obligant party—thus avoiding in these various cases the difficulty and risk of transporting coin. The idea, wherever first exemplified, was too good to be lost. It was early developed into a system in Venice, later in Amsterdam, and is now of world-wide application.

It is well to observe, first, what is exchanged—values of commodities exported and sold from one place or country to another, debts thereby owing, interest, profits of capital invested abroad, foreign loans and subsidies, freights, banking and other commissions, expenses of foreign residence or travel, and, in short, claims of payment of every kind on one part, having their relative obligations of remittance on the other, and originally denominated, as the contract or the occasion may have been, in the money either of the places from which the claims proceed or of those where they are payable. Secondly, the means must be noticed by which the exchange is effected—pieces of paper, bearing express calculation to secure what is exactly due between debtor and creditor. A bill of exchange is an order drawn for a specified and definite sum, in favor of a person who is the buyer and becomes the "remitter" of the order, upon a third person, the "drawee," who is indebted for this sum to the drawer, and on presentation of the order becomes the "acceptor." The person or company in whose favor the order is drawn may pass it into other hands, and these, by writing their names on the back, become "indorsers." On much the same model there are "inland" and "foreign" bills of exchange. The whole system of exchange has its foundation in the drawing of the creditor on the debtor; for, as in every country there are both creditors and debtors of other countries, the debtors find it to their advantage to take up the drafts of the creditors in order to avoid direct remittance in cash.

Inland exchange is simpler in character and more easily comprehended than foreign exchange, but in reality presents the same phenomena and the same sequence of cause and effect as the other, so far as the circumstances of any country allow these to come into operation.

**EXCHEQUER, COURT OF EXCHEQUER, EXCHEQUER CHAMBER.** The name *scaccarium*, from which the word "exchequer" is derived, was used under the Norman kings of England to signify the treasury. Madox, in his learned *History of the Exchequer*, exhausts the possible definitions of the word. According to some, it is connected with *scaccas* or *scaccum*, a chess-board, and the exchequer of England "was in all probability, called *scaccarium* because a chequered cloth (figured with squares like a chess-board) was anciently wont to be laid on the table in the court or place of that name." "From the Latin," continues Madox, "cometh the French *eschequier* or *exchequier*, and the English name from the French. Or if any one thinks more likely that the French word was the ancients, and the Latin one formed from it, I do not oppose him—nay, I incline to believe it was so." Another and less probable explanation is, that the original word was *statarium*, "from its stability, as it was the firm support of the crown or kingdom." But Madox points out that from the early times of the Conquest onward it was always called *scaccarium* and never *statarium*.

At the present day, exchequer means two very differ-



ent and independent institutions, the historical origin of which is one and the same. It is a court of law -- one of three superior courts at Westminster. It is also the treasury. The connection between the treasury and the court is still kept up in one or two points. The chancellor of the exchequer still takes his seat in the Exchequer Court on certain formal occasions, and the Exchequer Court (or, as it is now called, the Exchequer Division) is still the appropriate tribunal for cases connected with the revenue.

EXCISE, a term of obvious Latin derivation, now well known in public finance, signifying a duty charged on home goods, either in the process of their manufacture or before their sale to the home consumers. This form of taxation implies a commonwealth somewhat advanced in manufactures, markets, and general riches; and it interferes so directly with the industry and liberty of the subject that it has seldom been introduced save in some supreme financial exigency, and has as seldom been borne, even after long usage, with less than the ordinary impatience of taxation. Yet excise duties can boast a respectable antiquity, having a distinct parallel in the *vectigal rerum venalium* (or toll levied on all commodities sold by auction or in public market) of the Romans. But the Roman excise was mild compared with that of modern nations, having never been more than 1 per cent of the value; and it was much shorter-lived than the modern examples, having been first imposed by Augustus, reduced for a time one-half by Tiberius, and finally abolished by Caligula, 38 A.D.; so that the Roman excise cannot have had a duration of much more than half a century. Its remission must have been deemed a great boon in the marts of Rome, since it was commemorated by the issue of small brass coins with the legend *Remissis Centesimis*, specimens of which are still to be found in collections.

The history of this branch of revenue in Great Britain dates from the period of the civil wars, when the republican government, following the example of Holland, established, as a means of defraying the heavy expenditure of the time, various duties of excise, which the Royalists, when restored to power, found too convenient or necessary to be abandoned, notwithstanding their Roundhead origin and general unpopularity. On the contrary, they were destined to be steadily increased both in number and in amount. It is curious that the first commodities selected for excise were those to which this branch of taxation, after great extension, has again, in the age of reform and free trade, been in a manner permanently reduced, viz., malt liquors, and such kindred beverages as cider, perry, and spruce beer. The other excise duties remaining are chiefly in the form of licenses, such as to kill game and to use and carry guns, to sell gold and silver plate, to pursue the business of appraisers or auctioneers, hawkers or peddlers, pawnbrokers, or patent-medicine vendors, to manufacture tobacco or snuff, to deal in sweets or in foreign wines, to make vinegar, to roast malt, or to use a still in chemistry or otherwise. It may be presumed that the policy of the license duties is not so much to collect revenue, though in the aggregate they yield a large sum, as to guard the main source of excise, and to place certain classes of dealers, by registration and an annual payment to the exchequer, under a direct legal responsibility. The excise system of Great Britain, as now pruned and reformed, however, while still the most prolific of all the sources of revenue, is simple in process, and is contentedly borne as compared with what was the case in the last and the beginning of the present century. The wars with Bonaparte strained the government resources to the uttermost, and excise duties were multiplied and increased in every practicable form. Bricks, candles,

calico prints, glass, hides and skins, leather, paper, salt, soap, and other commodities of home manufacture and consumption were placed, with their respective industries, under excise surveillance and fine.

EXCOMMUNICATION, the highest ecclesiastical censure, is the judicial exclusion of a baptized person from the fellowship of the visible church of Christ. As part of the discipline of the church it is based on the precept of Christ (Mat. xvi, 19, xviii, 15-18; John xx, 23), and on apostolic example (I. Cor. v, 5; I. Tim. i, 20, etc.). These and the other texts, however, bearing, or supposed to bear, on the subject of excommunication, have not by any means been uniformly interpreted; and the usages ostensibly based on them have differed accordingly. The praxis of Christian discipline, moreover, has never been wholly independent of Jewish and pagan influences; and its variations cannot be adequately explained unless account be taken of several non-Christian analogues of excommunication. Among other pagan analogues may be mentioned the Roman *exsecratio* and *diris devotio*; the awful power which the Druids claimed of excluding from the sacrifices. But more influential than any of these has been the ancient Jewish practice. The word used in the New Testament to describe an excommunicated person, *anathema*, is the constant LXX. rendering of the Hebrew *herem* (see ANATHEMA). This word (*herem*) in its primary signification means simply any person or thing separated or set apart, a meaning which is still seen in the familiar Arabic word "harem." The connection in thought between the notions separation from common use, dedication to God, and devotion to destruction is not very obscure, and it soon established itself in the Hebrew mind. If in this *herem* we already find the analogue of the major excommunication (called *anathema*) of the mediæval church, we may perhaps look for the analogue of the minor in that temporary separation or seclusion (*niddah*) which was prescribed for ceremonial uncleanness.

The Talmud recognises two kinds of excommunication, a minor and a major, called respectively *niddui* and *herem*. The *niddui* (from *niddah*, to drive away) could be pronounced at any time by any competent individual; its validity continued for thirty days, during which period the subject of it was expected to go into mourning, absent himself from the synagogue, and separate himself from all his fellows by a distance of not less than four ells. He was not excluded from the temple, but if he visited it he was required to enter by a separate door. If at the end of thirty days he showed impenitence or contumacy, the *niddui* might be renewed once and again; and finally in certain circumstances, the *herem* might be pronounced. A valid *herem*, which could only be pronounced by a court of not less than ten judges, had the effect of excluding from the temple as well as from the synagogue, and from all association with the faithful. Some writers have asserted that there was a still more terrible, because irrevocable, sentence called the *shammatta*; but the preponderance of evidence is against this statement.

As an authority upon Jewish usages the Talmud does not go nearly so far back as to the beginning of the first Christian century. It is to the New Testament alone that we must look for any little information that can be had on the contemporary practice of the Jewish courts. The sentence of exclusion from the synagogue is plainly indicated in Luke vi, 22; John ix, 22, xii, 42, and the more severe sentence seems to be hinted at in John xvi, 2. The question as to the period at which the Jewish synedrium ceased to have the power of giving full effect to the *herem* spoken of in Leviticus, has been much disputed. The Talmud itself says that the judgment of



capital causes was taken away from Israel forty years before the destruction of the temple. But the point whether the synedrium which tried Jesus Christ could lawfully claim that power is still unsettled.

It has been already said that the use of excommunication as a part of Christian discipline, is based on the precept of Christ and on the apostolic practice. The general principles which ought to be observed can be easily gathered from the New Testament writings; but the church appears to have been left, for most of the practical details, to the guidance of reason and experience.

The writings of the church fathers give sufficient evidence that two degrees of excommunication were in use during, or at least soon after, the apostolic age. The former, which involved exclusion from participation in the eucharistic service and from the eucharist itself, though not from the so-called "service of the catechumens," was the usual punishment of comparatively light offenses; the latter, which was the penalty of graver scandals, involved "exclusion from all church privileges" — a vague expression which has sometimes been interpreted as meaning total exclusion from the very precincts of the church building and from the favor of God. For some sins, such as adultery, the sentence of excommunication was in the second century regarded as irrevocable. Difference of opinion as to the absolutely "irremissible" character of mortal sins led to the important controversy associated with the names of Zephyrinus, Tertullian, Callistus, Hippolytus, Cyprian, and Novatian, in which the stricter and more montanistic party held that for those who had been guilty of such sins as theft, fraud, denial of the faith, there should be no restoration of church fellowship, even in the hour of death.

A new chapter in the history of church censure may be said to have begun with the publication of those imperial edicts against heresy, the first of which dates from 380. Till then exclusion from church privileges had been a spiritual discipline merely; thenceforward it was to expose a man to serious temporal risks. Excommunication still continued to be occasionally used in the spirit of genuine Christian fidelity, as by Ambrose in the case of Theodosius himself (390); but the temptation to wield it as an instrument of secular tyranny too often proved to be irresistible. In the formula used by Synesius (410) we already find the attention of magistrates specially called to the censured person. The history of the next thousand years shows that the magistrates were seldom slow to respond to the appeal. Even the hastiest survey of that long and interesting period enables the student to notice a marked development in the theory and practice of excommunication. One or two points may be specially noted. (1.) While it had been held as an undoubted principle by the ancient church that this sentence could only be passed on living individuals, whose fault had been distinctly stated and fully proved, we find the mediæval church on the one hand sanctioning the practice of excommunication of the dead, and on the other hand, by means of the papal interdict, excluding whole counties and kingdoms at once from the church privilege. The earliest well-authenticated instance of such an interdict is that which was passed (998) by Pope Gregory V. on France, in consequence of the contumacy of King Robert the Wise. (2.) While in the ancient church the language used in excommunicating had been carefully measured, we find an amazing recklessness in the phraseology employed by the mediæval clergy. The curse of Ernulphus or Arnulphus of Rochester (cir. 1100), which has been made familiar to most students of English literature, is a very fair specimen of that class of composition.

At the Reformation the necessity for church discipline did not cease to be recognized; but the administration of it in many Reformed churches passed through a period of some confusion. In some instances the old episcopal power passed more or less into the hands of the civil magistrate (a state of matters which was highly approved by Erastus and his followers), in other cases it was conceded to the presbyterial courts. In the Anglican Church the bishops (subject to appeal to the sovereign) have the right of excommunicating, and their sentence, if sustained, may in certain cases carry with it civil consequences.

EXECUTORS AND ADMINISTRATORS, in law, are those on whom the personal property of a deceased person devolves, according as he has or has not left a will. If a man dies and leaves a will, the person or persons named therein to carry out his intentions are his executors, and their title to the personality vests at the moment of the testator's death. If there is no will, the right of administering the personal estate of the deceased is granted, according to certain rules, by the court of probate to persons who are called administrators. When the will contains no nomination of executors, administration is said to be granted "with the will annexed." The title of the administrator vests at the date of the letters of administration. As to the appointment of executors and administrators before the establishment of the court of probate, see articles WILL and TESTACY. The executors or administrators when appointed become the legal personal representatives of the deceased. As to powers and duties administrators stand in the same position as executors.

EXELMANS, RENEY JOSEPH ISIDORE, a distinguished French general, was born at Bar-le-Duc, November 13, 1775. He volunteered into the 3d battalion of the Meuse in 1791, became lieutenant in 1797, and in 1798 was attached as aide-de-camp to General Eblé. In his first campaign in Italy he greatly distinguished himself; and in April, 1799, he was rewarded for his services by the grade of captain in the 16th regiment of dragoons. In the same year he took part with honor in several battles connected with the conquest of Naples, and was promoted to the rank of major; and in 1801 he became aide-de-camp to General Murat. He was named chief of a squadron in 1803, and he accompanied Murat in the Austrian, Prussian, and Polish campaigns of 1805, 1806, and 1807. At the passage of the Danube, and in the battle of Wertingen, he specially distinguished himself; he was made colonel of the 1st regiment of chasseurs for the valor which he displayed at Austerlitz; and after the battle of Eylau in 1807 he obtained the rank of brigadier-general. In 1808 he accompanied Murat to Spain, but was there made prisoner and conveyed to England. On regaining his liberty in 1811 he went to Naples, where King Murat appointed him grand master of horse; but when Murat became estranged from Napoleon, Exelmans left his court and joined the French army. Napoleon was then entering on his Russian campaign, and gave him welcome and immediate employment as a general of division. He was present at the battle of Moscow, and in the famous retreat from that city his steadfast courage was conspicuously manifested on several occasions. In 1813 he received for services in the campaign of Saxony, the decoration of the Legion of Honor; and in 1814 he reaped additional glory by his intrepidity and skill in the campaign of France.

When the Bourbons were restored, in 1815, he retained his position in the army, but this did not prevent Napoleon, on his return from Elba, from intrusting him with the command of the second army corps. After the second restoration he was proscribed, and lived in Bel-



gium, and subsequently in Nassau, till 1819, when he was recalled to France. In the following year he was appointed to an inspector-generalship of cavalry; and, after the July revolution of 1830, he received from Louis Philippe the grand cross of the Legion of Honor, and was created a peer of France. In the House of Peers he denounced the execution of Marshal Ney as an "abominable assassination." At the revolution of 1848 Exelmans was one of the adherents of Louis Napoleon; and in 1851 he was, in recognition of his long and brilliant military career, raised to the dignity of a marshal of France. His death, July 10, 1852, was the result of a fall from his horse.

EXETER, the chief town of Devonshire, in England, a city which is a county in itself, and a municipal and parliamentary borough, stands on the Exe, about ten miles northwest of the mouth of the river, where it opens to the English channel. The distance of Exeter from London is 194 miles. The ancient city (round which suburbs have extended) occupies a broad ridge of land, which rises steeply from the left bank of the Exe. At the head of the ridge is the castle, on the site of a great British earthwork. This was the stronghold of *Caer Isc* (so named from the River Isc or Exe, meaning water); and the British town became the *Isca Damnoniorum* of the Romans, just as *Isca Silurum* was the Roman name of Caerleon on the *Usk*, in South Wales. Roman coins, tessellated pavements, pottery, and sepulchral urns have been found from time to time, proving that the station was one of importance. It was one of the few cities in Britain which were not deserted at the time of the Saxon Conquest; and when Athelstan came westward, about 926, he found *Exanclaster*, the "chester" or fortified town on the Exe, as the Saxons called it, occupied by Britons and Saxons *æquo jure*. The ground plan of the city indicates its Romano-British origin, since the principal streets cross each other nearly in the center. The main, or High Street is, in fact, a portion of the Roman road which extended from the eastern border of the county to the Tamar. Exeter was more than once attacked by the Northmen; but the walls which had been constructed by Athelstan greatly protected the "burgh;" and in 1050 the Episcopal See of Devonshire, which had been founded at Crediton about 910, was removed, for greater security, to Exeter.

The position of Exeter, and its importance as the principal city of the western peninsula, have affected the whole course of its history, and led to its numerous sieges. In 1068 the Conqueror appeared before Exeter, beleaguered it for eighteen days, and then received the submission of its citizens. He afterward founded the castle, known as "Rougemont," from the red color of the rock on which it stands. The castle was held for Matilda in 1137 by Baldwin de Redvers, Earl of Devon; and King Stephen took it after a siege of three months. Exeter was Lancastrian, and, in 1469, held out successfully against Sir William Courtenay and the Yorkists. In 1497 it was besieged by Perkin Warbeck, and in 1549 for thirty-five days by the men of Devon and Cornwall, who rose in defense of the "old religion." The city was taken and retaken during the Civil War; and the queen gave birth there to the Princess Henrietta, afterward Duchess of Orleans. After that period the most noticeable event is the entry of the Prince of Orange (William III.) in November, 1688. His "declaration" was then read by Burnet in the cathedral.

The most important buildings in the city are the cathedral, the guildhall, and the Albert Memorial museum; and the remains of the castle are also of interest.

EXHIBITIONS. National and International ex-

hibitions may be ranked among the most remarkable features in the industrial records of the world, and have taken their place as prominent instruments of civilization, for by their means the diffusion of knowledge has been advanced and extended in the most wonderful manner. (See INDUSTRIAL EXHIBITIONS.)

EXMOUTH, a market-town and watering-place in the county of Devon, England, is situated at the mouth of the Ex, ten miles east-southeast of Exeter. It was the first watering-place on the coast of Devon, and is frequented, not only for bathing but also as a winter residence, by those suffering under pulmonary diseases, as it is celebrated for the mildness of its climate, and is well sheltered from the northeast and southeast winds by some high hills. Population, 7,000.

EXMOUTH, EDWARD PELLEW, VISCOUNT, an English admiral, was descended from a family which came originally from Normandy, but had for many centuries been settled in the west of Cornwall. He was born at Dover, April 19, 1757. At the age of thirteen he entered the navy, and even then his smartness and activity, his feats of daring, and his spirit of resolute independence awakened remark, and pointed him out as one specially fitted to distinguish himself in his profession. He had, however, no opportunity of active service till 1776, when, at the battle of Lake Champlain, his gallantry, promptitude, and skill, not only saved the *Carleton*—whose command had devolved upon him during the progress of the battle—from imminent danger, but enabled her to take a prominent part in sinking two of the enemy's ships. For his services on this occasion he obtained a lieutenant's commission, and the command of the schooner in which he had so bravely done duty. The following year, in command of a brigade of seamen, he shared in the hardships and perils of the American campaign of General Burgoyne. In 1782, in command of the *Pelican*, he attacked three French privateers inside the Isle of Bass, and compelled them to run themselves on shore—a feat for which he was rewarded by the rank of post-captain. On the outbreak of the French war in 1793, he was appointed to the *Nymphe*, a frigate of thirty-six guns; and, notwithstanding that for the sake of expedition she was manned chiefly by Cornish miners, he captured, after a desperate conflict, the French frigate *La Cléopâtre*, a vessel of superior size to his own and better armed. For this act he obtained the honor of knighthood.

In 1794 he received the command of the *Arethusa*, and, in a fight with the French fleet off the Isle of Bass, he compelled the *Pomona* to surrender. The same year the western squadron was increased and its command divided, the second squadron being given to Sir Edward Pellew. While in command of this squadron he, on several occasions, performed acts of great personal daring; and for his bravery in boarding the wrecked transport *Dutton*, and his promptitude and resolution in adopting measures so as to save the lives of all on board, he was, in 1796, created a baronet. In 1798 he joined the channel fleet, and, in command of the *Impétueux*, took part in several actions with great distinction. In 1802 Sir Edward Pellew was elected member of parliament for Dunstable, and during the time that he sat in the Commons he was a strenuous supporter of Pitt. In 1804 he was made rear-admiral of the blue, and appointed commander-in-chief in India, where, by his vigilance and rapidity of movement, he entirely cleared the seas of French cruisers, and secured complete protection to English commerce. He returned to England in 1809, and in 1810 was appointed commander-in-chief in the North Sea, and in 1811 commander-in-chief in the Mediterranean. In 1814 he was created Baron Exmouth, of Canonteign. When the Dey of Algiers, in 1816, violated



the treaty for the abolition of slavery, Exmouth was directed to attack the town. Accordingly, on August 26th, he engaged the Algerine battery and fleet, and, after a severe action of nine hours' duration, he set on fire the arsenal and every vessel of the enemy's fleet, and shattered her sea defenses into ruins. At the close of the action the Dey apologized for his conduct, and agreed to a renewal of the treaty, at the same time delivering up 1,800 persons of various nations who had been Algerine slaves. For this splendid victory Exmouth was advanced to the dignity of Viscount. Shortly before his death, which took place January 23, 1833, he was made vice-admiral.

EXODUS. See PENTATEUCH.

EXORCISM, the act of expelling evil spirits from persons or places by means of certain adjurations and ceremonies, appears in the present customs or past history of almost every nation of the world. Its importance is greatest among barbarous peoples, whose belief in attacks of demons furnishes them with a general theory to account for misfortunes, mysterious events, and especially all diseases of body or mind, so that the exorcists, who are usually priests or sorcerers, become in fact the recognized order of physicians (see article DEMONOLOGY).

EXPIATION or ATONEMENT, DAY OF, called in the Mishna simply "the Day," the only fast enjoined by the Mosaic legislation, occurred annually on the tenth day of the seventh month (Tisri). The laws for its observance are given in Lev. xvi, 1-34, xxiii, 27-32, and Numb. xxix, 7-11. The high priest was to enter the Most Holy Place according to a minutely detailed ritual, and so "make an atonement for" the sanctuary, the tabernacle, the altar, the priests, and all the people. From the one evening to the other the people were enjoined, under the severest penalties, to "afflict their souls," and observe a "perfect sabbath."

EXPLOSIVES. It lies beyond the object of this article to attempt an estimate of the influence, direct or indirect, upon modern civilization of the introduction of explosive agents for the purposes of war. Some eminent authors have gone so far as to consider the invention of gunpowder as next in importance, in its ultimate effects, to those of printing and the application of steam power. However this may be, it is well to remember that explosive substances are now of immense utility in the arts of peace; indeed, it is not too much to say that without their aid many of the great engineering enterprises of the present day would either be impossible, or else have to be carried out at a vast additional expenditure of time and labor.

The germ of all the knowledge of explosive reaction we possess undoubtedly lay in the probably accidental discovery, many ages ago, of the deflagrating properties of the natural substance niter or saltpeter, when in contact with incandescent charcoal. To trace the consequences of that discovery, very gradual as they have been, and intimately bound up with the progress of chemical and mechanical science, belongs rather to an article on gun-powder; but the fact may be briefly referred to in connection with the second great epoch in the history of explosive substances. By distilling niter with oil of vitriol, the alchemists obtained a corrosive fluid which they called *aqua fortis*, now known as nitric acid, which parts with its oxygen even more readily than saltpeter; so that if the strongest nitric acid be poured upon finely powdered charcoal, the latter takes fire at the ordinary temperature. Somewhat less than half a century back, it was discovered by some French chemists that upon treating various organic substances, such as starch, the sugars, cotton fabrics, and even paper, with concentrated nitric acid under proper precautions, the

chemical constitution of the substances underwent a great change, and they became endowed with violently explosive properties, while remaining for the most part unaltered in external characteristics. To this discovery we owe a distinct class of explosive compounds, the most powerful for practical purposes as yet known.

We will now proceed to examine into those principles of constitution and action which are more or less common to all explosive substances.

As the term is often rather loosely employed, "explosion" may for our purpose be defined as the sudden or extremely rapid conversion of a solid or liquid body of small bulk into gas or vapor, occupying very many times the volume of the original substance, and, in addition, highly expanded by the heat generated during the transformation. This sudden or very rapid expansion of volume is attended by an exhibition of force, more or less violent according to the constitution of the original substance and the circumstances of explosion. Any substance capable of undergoing such a change upon the application of heat, or other disturbing cause, is called "explosive."

The explosive substances that are practically the most important essentially contain carbon, oxygen, and nitrogen, the last always existing in a state of feeble combination with the whole or part of the oxygen, and thus creating that condition of unstable chemical equilibrium which is necessary. When explosion takes place, the nitrogen parts with its oxygen to the carbon, for which it has a great affinity, forming carbonic acid, and carbonic oxide gases, the combination being accompanied with great generation of heat, and the nitrogen gas is set free. In most explosives there is also hydrogen accompanying the carbon, and by its combustion producing an extremely high temperature; it combines with part of the oxygen to form water in the form of greatly expanded vapor. Other subordinate elements are often present; in gunpowder, for instance, the potassium binds the nitrogen and oxygen loosely together in the state of saltpeter, and there is sulphur, a second combustible, whose oxidation evolves greater heat than that of carbon. When chlorate of potash is present, the chlorine plays the part of the nitrogen, and is set free in the gaseous state. Two very unstable and practically useless explosive substances, the so-called chloride and iodide of nitrogen, contain neither carbon nor oxygen; but their great violence is equally caused by the feeble affinities of nitrogen for other elements, large volumes of gaseous matter being suddenly disengaged from a very small quantity of a liquid and solid body respectively.

Explosives may be conveniently divided into two distinct classes — (1) explosive mixtures, and (2) explosive compounds.

The first class consists of those explosive substances which are merely intimate mechanical mixtures of certain ingredients, and which can be again separated more or less completely by mechanical means, not involving chemical action. These ingredients do not, as a rule, possess explosive properties in their separate condition. There are, however, explosives which might almost be classed in both categories; for example, *picric powder* is composed of ammonium picrate and saltpeter, the former of which contains an explosive molecule, but is mixed with the latter to supply additional oxygen, and thus increase the force.

If a substance that will burn freely in air, combining gradually with the oxygen of the atmosphere, be ignited in pure oxygen gas, the combustion will be much more rapid, and the amount of heat generated greater, at the ordinary atmospheric pressure. If it be possible to burn the substance in a very condensed atmosphere of oxygen



We can readily imagine the combustion being very greatly accelerated, and therefore increased in violence; this is what is ordinarily effected by an explosive "mixture." A combustible body and a supporter of combustion are brought into extremely close contact with one another, by means of intimate mechanical mixture; also, the supporter of combustion or oxidizing agent is present in a very concentrated form, constituting what may be termed a magazine of condensed oxygen, solid or liquid. In the case of the explosion of a definite chemical compound, the change may be considered as the resolution of a complex body into simpler forms; this is not, however, always the case when a mechanical mixture is concerned: gunpowder for example, may be said to contain two elementary substances, carbon and sulphur, not in mechanical union.

The chief explosive mixtures may be subdivided into "nitrate mixtures," and "chlorate mixtures."

In the nitrates, the oxygen is held in combination with sufficient force to need a powerful disturbing cause to separate it, so that mixtures made from nitrates do not explode very readily, and their action is comparatively gradual; they are not sensitive to friction or percussion, and hence are tolerably safe. Any of the nitrates will form explosive mixtures with combustible substances, but nitrate of potash is the only one practically employed. The nitrate of soda, called "cubical" or Chili saltpeter, has been used, but absorbs moisture from the air so readily as to give very inferior results. Gunpowder may be taken as the representative of the nitrate explosive mixtures. Picric powder, above referred to, has been proposed by Abel for use as a bursting charge for shells, as being more powerful than a corresponding charge of gunpowder, equally safe as regards friction or percussion, and less hygroscopic; it consists of two parts ammonium picrate, and three parts saltpeter, incorporated, pressed, and finished very much as ordinary gunpowder.

The chlorates part with their oxygen far more readily than the nitrates, the strong affinities of chlorine for the metals coming into play, and consequently chlorate mixtures are very sensitive to friction and percussion, and explode with great violence; chlorate of potash is the only one used. Very many chlorate mixtures have been made, some of which are employed in fireworks. "White gunpowder" is a mixture of two parts chlorate of potash, one of yellow prussiate of potash, and one of sugar; it is exploded very easily by friction or percussion. The most important chlorate mixtures are those used for igniting other explosives, such as the composition for friction tubes for firing cannon, percussion cap composition, and percussion fuses for bursting shells on impact; it is sometimes mixed with sulphur, as a combustible, and sometimes with black sulphide of antimony, which gives a longer flame.

In an explosive "compound," the elements are all in chemical combination, presenting a definite explosive "molecule," which contains, so to speak, both the combustible and the supporter of combustion, in the closest possible union; we can therefore understand its action being much more sudden and violent than that of the most intimate mechanical mixture.

The chief explosive compounds are formed from some organic substance containing carbon, hydrogen, and oxygen, by introducing into it, through the action of concentrated nitric acid, a certain portion of nitric peroxide, in substitution for an equivalent amount of hydrogen. A new compound, differing outwardly very little, if at all, from the original substance, is thus formed, but in a very unstable state of chemical equilibrium, because of the feeble union of the nitrogen and oxygen in the nitric peroxide molecule. A slight disturbing

cause brings into play the stronger affinity of the carbon and hydrogen for the large store of oxygen contained in the new compound. Gun-cotton and nitro-glycerine are the leading members of this group, being produced in a precisely similar manner, by the substitution of three molecules of nitric peroxide for three atoms of hydrogen.

The fulminates after nitro-glycerine are among the most violent of all explosive compounds, their chemical stability being very small. Sudden in action, their effect is great locally; thus they are well adapted to the purpose, for which alone they are practically used, of igniting, or upsetting the equilibrium of other explosives.

When an explosive substance is exploded in a closed vessel sufficiently strong to resist rupture, the tension attains its maximum value in an extremely short space of time and gradually decreases from the heat being conducted away by the metal envelope, and dispersed by radiation. It has, however, been demonstrated that, at the moment of maximum tension, the loss of pressure due to the communication of heat to the vessel, if the latter be filled with the explosive, is less than 1 per cent. The products of combustion, after cooling down, can easily be determined by analysis, and are then either wholly gaseous, as chloride or iodide of nitrogen; gaseous and liquid, in the case of gun-cotton and nitro-glycerine; or gaseous and solid, as with gunpowder. It is certain that, at the moment of explosion, the products of the more violent explosive compounds are wholly in a state of gas or vapor, but we should arrive at incorrect results by making the same assumption in the case of a mechanical mixture like gunpowder.

EXTRACTS, in a technical sense, are medicinal preparations of vegetable principles, got either by putting the plants in a solvent or menstrum, and then evaporating the liquid down to about the consistency of honey, or by expressing the juice of the plants and evaporating; this last is properly inspissated juice. Extracts, therefore, contain only those vegetable principles that are either held in solution in the juices of the plants themselves, or are soluble in the liquid employed in extracting them, and at the same time are not so volatile as to be lost during evaporation.

EXTRADITION. When a person who has committed an offense in one country escapes to another, what is the duty of the latter with regard to him? Should the country of refuge try him in its own courts according to its own laws, or deliver him up to the country whose laws he has broken? To the general question international law gives no certain answer. Some jurists, Grotius among them, incline to hold that a state is bound to give up fugitive criminals, but the majority appear to deny the obligation as a matter of right, and prefer to put it on the ground of comity, and the universal practice of nations is to surrender criminals only in consequence of some special treaty with the country which demands them.

There are two practical difficulties about extradition which have probably prevented the growth of any uniform rule on the subject. One is the variation in the definitions of crime adopted by different countries. The second is the possibility of the process of extradition being employed to get hold of a person who is wanted by his country, not really for a criminal, but for a political offense. In modern states offenses of political character have always been excluded from the operation of the law of extradition.

Extradition, as stated above, has for the most part been regulated by special treaties.

EXTRAVASATION is the escape of any of the fluids of the living body from their proper vessels (*vas*) through a rupture or injury in their walls. Excrementitious matter thus sometimes escapes into the abdomen



through a wound or ulceration of the bowels. Extravasation is distinguished from exudation by this, that in the last the vessels remain entire, and the effusion takes place by filtration through their walls; nor does more than a part of the blood so escape.

**EXTREME UNCTION**, one of the sacraments of the Roman Catholic Church, to be administered *only* after those of penance and the Eucharist to persons who are supposed to be at the point of death. Among the Orientals oil has long been employed as a cure for various disorders, as well as for the purpose of promoting the general health of the body. According to the narrative of Mark it was employed by the disciples of Jesus apparently for the purpose of effecting miraculous cures. The apostle James also exhorts Christians to make use of it, accompanied with prayer, in the case of sick persons.

**EYCK, VAN**, the name of a family of painters, in whose works the rise and mature development of art in Western Flanders are represented. Though bred in the valley of the Meuse, they finally established their professional domicile in Ghent and in Bruges; and there, by skill and inventive genius, they changed the traditional habits of the earlier schools, remodeled the primitive forms of Flemish design, and introduced a complete revolution into the technical methods of execution familiar to their countrymen.

1. **HUBERT VAN EYCK** was the oldest and most remarkable of this race of artists. The date of his birth, and the records of his progress, are lost amidst the ruins of the earlier civilization of the valley of the Meuse. He was born about 1366 at Maeseyck, under the shelter or protection of a Benedictine convent, in which art and letters had been cultivated from the beginning of the eighth century. But after a long series of wars — when the country became insecure, and the schools, which had flourished in the towns, decayed — he wandered to Flanders, and there, for the first time, gained a name. As court painter to the hereditary Prince of Burgundy, and as client to one of the richest of the Ghent patricians, Hubert is celebrated. Here, in middle age, between 1410 and 1420, he signalized himself as the inventor of a new method of painting. Here he lived, in the pay of Philip of Charolais, till 1421. Here he painted pictures for the corporation, whose chief magistrates honored him with a state visit in 1424. His principal masterpiece, and the only picture that can be traced to his hand, the *Worship of the Lamb*, commissioned by Jodocus Vijdts, Lord of Pamele, is the noblest creation of the Flemish School, a piece of which we possess all the parts, dispersed from St. Bavon in Ghent, to the galleries of Brussels and Berlin — one upon which Hubert labored till he died, leaving it to be completed by his brother. Almost unique, as an illustration of contemporary feeling for Christian art, this great composition can only be matched by the *Fount of Salvation*, in the museum of Madrid. It represents, on numerous panels, Christ on the judgment seat, with the Virgin and St. John the Baptist at his sides, hearing the songs of angels, and contemplated by Adam and Eve, and, beneath him, the Lamb shedding His blood in the presence of angels, apostles, prophets, martyrs, knights, and hermits. On the outer sides of the panels are the Virgin and the angel annunciate, the sybils and prophets who foretold the coming of the Lord, and the donors in prayer at the feet of the Baptist and Evangelist.

When Hubert died on September 18, 1426, he was buried in the chapel, on the altar of which his masterpiece was placed. According to a tradition, as old as the sixteenth century, his arm was preserved as a relic in a casket, above the portal of St. Bavon of Ghent. During a life of much apparent activity and surprising

successes, he taught the elements of his art to his brother John, who survived him.

**JOHN VAN EYCK**. The date of his birth is not more accurately known than that of his elder brother, but he was born much later than Hubert, who took charge of him and made him his "disciple." Under this tuition John learnt to draw and paint, and mastered the properties of colors from Pliny. Later on, Hubert admitted him into partnership, and both were made court painters to Philip of Charolais. After the breaking up of the prince's household in 1421, John became his own master, left the workshop of Hubert, and took an engagement as painter to John of Bavaria, at that time resident at the Hague as Count of Holland. From the Hague he returned in 1424 to take service with Philip, now Duke of Burgundy, at a salary of 100 livres per annum, and from that time till his death John Van Eyck remained the faithful servant of his prince, who never treated him otherwise than graciously. He was frequently employed in missions of trust; and following the fortunes of a chief who was always in the saddle, he appears for a time to have been in ceaseless motion, receiving extra pay for secret services at Leyden, drawing his salary at Bruges, yet settled in a fixed abode at Lille. In 1528 he joined the embassy sent by Philip the Good to Lisbon to beg the hand of Isabella of Portugal. His portrait of the bride fixed the duke's choice. After his return he settled finally at Bruges, where he married, and his wife bore him a daughter, known in after years as a nun in the convent of Maeseyck. At the christening of this child the duke was sponsor, and this was but one of many distinctions by which Philip the Good rewarded his painter's merits. Numerous altarpieces and portraits now give proof of Van Eyck's extensive practice. As finished works of art and models of conscientious labor they are all worthy of the name they bear, though not of equal excellence, none being better than those which were completed about 1432. Of an earlier period, a *Consecration of Thomas à Becket* has been preserved, and may now be seen at Chatsworth, bearing the date of 1421; no doubt this picture would give a fair representation of Van Eyck's talents at the moment when he started as an independent master, but that time and accidents of omission and commission have altered its state to such an extent that no conclusive opinion can be formed respecting it. The panels of the *Worship of the Lamb* were completed nine years later. They show that John Van Eyck was quite able to work in the spirit of his brother. He had not only the lines of Hubert's compositions to guide him, he had also those parts to look at and to study which Hubert had finished.

He continued the work with almost as much vigor as his master. His own experience had been increased by travel, and he had seen the finest varieties of landscape in Portugal and the Spanish provinces. This enabled him to transfer to his pictures the charming scenery of lands more sunny than those of Flanders, and this he did with accuracy and not without poetic feeling. We may ascribe much of the success which attended his efforts to complete the altarpiece of Ghent to the cleverness with which he reproduced the varied aspect of changing scenery, reminiscent here of the orange groves of Cintra, there of the bluffs and crags of his native valley. He excels in two splendid likenesses of Jodocus Vijdts and his wife Catherine Burluuts. The same vigorous style and colored key of harmony characterizes the small Virgin and Child of 1432 at Ince, and the Madonna, probably of the same date, at the Louvre, executed for Rollin, Chancellor of Burgundy. Contemporary with these, the male portraits in the National Gallery, and the *Man with the Pinks*, in the Berlin Museum (1432-4) show no relaxation of power; but later crea-



tions display no further progress, unless we accept as progress a more searching delicacy of finish, counterbalanced by an excessive softness of rounding in flesh contours. An unfaltering minuteness of hand and great tenderness of treatment may be found, combined with angularity of drapery, and some awkwardness of attitude, in a full length portrait couple at the National gallery (1434), in which a rare insight into the detail of animal nature is revealed in the study of a terrier dog. A Madonna with Saints, at Dresden, equally soft and minute, charms us by the mastery with which an architectural background is put in. The bold and energetic striving of earlier days, the strong bright tone, are not equaled by the soft blending and tender tints of the latter ones. Sometimes a crude ruddiness in flesh strikes us as a growing defect, an instance of which is the picture in the museum of Bruges, in which Canon Van der Paelen is represented kneeling before the Virgin under the protection of St. George (1434). From first to last Van Eyck retains his ability in portrait. Fine specimens are the two male likenesses in the gallery of Vienna (1436), and a female, the master's wife, in the gallery of Bruges (1439). His death in 1440-41 at Bruges is authentically recorded. He was buried in St. Donat.

**EYE.** The sense of vision is excited by the influence of light on the retina, the special terminal organ connected with the optic nerve. By excitation of the retina, a change is induced in the optic nerve fibers, and is conveyed by these to the brain, the result being a luminous perception, or what we call a sensation of light or color. If light were to act uniformly over the retina, there would be no image of the source of the light formed on that structure, and consequently there would be only a general consciousness of light, without reference to any particular object. One of the first conditions, therefore, of vision for useful purposes, is the formation of an image on the retina. To effect this, just as in a photographic camera, refractive structures must be placed in front of the retina which will so bend luminous rays as to bring them to a focus on the retina, and thus produce an image. Throughout the animal kingdom, various arrangements are found for this purpose; but they may be all referred to three types, namely—(1) eye-specks or eye-dots, met with in Medusæ, Annelidæ, etc.; (2) the compound eye, as found in insects and crustaceans; and (3) the simple eye, common to all vertebrates. The *eye-specks* may be regarded simply as expansions of optic nerve filaments, covered by a transparent membrane, but having no refractive media, so that the creature would have the consciousness of light only, or a simple luminous impression, by which it might distinguish light from darkness. The *compound eye* consists essentially of a series of transparent cone-like bodies, arranged in a radiate manner against the inner surface of the cornea, with which their bases are united, while their apices are connected with the ends of the optic filaments. As each cone is separated from its neighbors, it admits only a ray of light parallel with its axis, and its apex represents only a portion of the image, which must be made up, like a mosaic work, of as many parts as there are cones in the eye. When the cones are of considerable length, it is evident, from their form and direction, their apices being directed inward, that the oblique rays emanating from a luminous surface will be cut off, and that only those rays proceeding along the axis of the cone will produce an effect. Thus distinctness or sharpness of definition will be secured. The size of the visual field will depend on the form of the eye, the outermost cones marking its limits. Consequently the size of the visual field will depend on the size of the segment of the sphere

forming its surface. The eyes of many insects have a field of about half a sphere, so that the creature will see objects before and behind it as well as those at the side. On the other hand, in many the eyes have scarcely any convexity, so that they must have a narrow field of vision.

A description of the simple eye will be found in the article ANATOMY. Optically, it consists of a series of refractive media placed in front of the retina, by which rays emanating from an external object are brought to a focus on that structure.

A luminous sensation may be excited by various modes of irritation of the retina or of the optical nerve. Pressure, cutting, or electrical shocks may act as stimuli, but the normal excitation is the influence of light.

**EYE, DISEASES OF THE.** The diseases of the eye are very numerous. Nearly all its parts are liable to inflammation and its consequences. The eyelids are liable to various diseases, as growths of several kinds, most of which the surgeon may remove; inflammation, as blear-eye (*ophthalmia tarsi*); to be misdirected inward or outward, *entropium* and *ectropion*, and the upper eyelid may fall down (ptosis) from palsy of the common motor oculi nerve. The eyelashes may grow in upon the eye (trichiasis), and produce serious results. When plucked out, they grow again, and frequently it is necessary to cut down on their roots, and destroy them. The duct which conveys away the tears to the nose is liable to inflammation and obstruction, causing watery eye. The cornea is liable to opacity in various degrees. The mere *nebula* or cloudy condition, either limited or general, may pass off, and leave the cornea again clear; but the white mark, which is the cicatrix or scar of an ulcer, is permanent although it may become smaller by the disappearance of the surrounding haze. The pupil may be closed as the result of iritis, or of operations for cataract, and an artificial pupil may be made by incision, excision, or separation; but the operation is seldom attended with success. Frequently "foreign bodies" get into the space between the eyeball and the upper lid. They cause great pain, and soon excite inflammation. The lid must be turned round to find them. To do this, pull the front or edge of the lid forward by the eyelashes, held with the finger and thumb, and at the same time press down the back part of the lid with a small pencil or key. The lid will readily turn round, when the body may be seen about the middle, and may be removed with the corner of a handkerchief. Another plan is to pull forward the upper lid by the eyelashes, and push the lashes of the lower lid up behind it, when the foreign body may be brushed out.

**EZEKIEL** (God will strengthen, or God will prevail; *Ezechiel*) was the son of Buzi, a priest, probably of the line of Zadok, who appears to have lived in Jerusalem, and to have held a position of some prominence there. According to an ancient and not impossible interpretation of his own words, Ezekiel was born in 624 B.C. This interpretation is at least preferable to that which reckons "the thirtieth year" from a hypothetical era of Nabopolassar; but it is not free from all objection, and if it fail us we have no data for precisely determining the prophet's age. Notwithstanding the expression made use of by Josephus, we may reasonably assume, however, that he had at least attained to early manhood, and already had read and observed much, when, along with King Jehoiachin and many other prisoners of the better class, he was carried into exile by Nebuchadnezzar in 599 B.C. With others of his compatriots he was settled at a place called Tel-Abib ("Corn-hill"), on the banks of the River Chebar, by which most probably the Nahr-Malcha or "Grand" Canal of Nebuchadnezzar is meant, though



some still think of the Chaboras (modern Khabur), an affluent of the Euphrates more to the north. We are left almost wholly to precarious inference and conjecture for all further details of his history. We learn incidentally, indeed, from his writings that he was a married man living in a house of his own, and that his wife died in the ninth year of his exile. But of the nature of his ordinary employments, if he had any, we are not informed. His life, as a priest whose heart was thoroughly absorbed in priestly work, could hardly fail to be tinged with sadness, condemned as it was to be spent in an "unclean land" far away from "the inheritance of the Lord." He seems to have been of a brooding temperament, and to have passed much of his time in silence and solitude. A recent writer has ingeniously suggested and endeavored to show that he was an invalid, suffering much from some chronic nervous malady. In the fifth year of his exile (594 B.C.) he had a remarkable vision, of which he has given a very full description in the opening chapters of his book. On this occasion he was divinely called to the prophetic office. Thenceforward, for a period of at least twenty-two years, both orally and in writing, he continued to discharge prophetic functions at frequent if somewhat irregular intervals; and whatever may have been the force and bitterness of the opposition he originally had to face, he ultimately, as a "watchman" and acknowledged leader of public opinion, came to exercise an incalculably powerful influence in keeping alive the Jewish national feeling, and also in quickening and purifying the religious hopes and aspirations of his time. The last date mentioned in his writings is the twenty-seventh year of his exile (572 B.C.). It is not probable that he lived long after that time. Nothing authentic, however, has been handed down to us as to the time, place, or manner of his death.

In the present Massoretic canon the book of Ezekiel stands third in order among those of the so-called Nebi'im Aharônîm (latter prophets), being preceded by those of Isaiah and Jeremiah, and followed by that of the twelve minor prophets. In the list of canonical books given in the Talmud, it is the second of the four, being followed by "Isaiah" and "the twelve." Its arrangement is unusually simple, the chronological corresponding for the most part with the natural order. Its three divisions date respectively from before, during, and after the siege of Jerusalem,

EZRA (*Esdras*), the famous scribe, was a priest of the line of Zadok. Josephus tells us, somewhat mysteriously, that Ezra himself was high-priest of the Jews who were left in Babylon. Be this as it may, we know that when he first appears in history, in the seventh year of Artaxerxes Longimanus (458 B.C.), he is already a man of great learning, zeal, and authority, enjoying the confidence, not only of his own compatriots, but also of the Persian king. It is to be regretted that we should so imperfectly know what was the true condition of the Jews in Babylon during the years that immediately followed the close of the "exile." We have various indications, however, that many of them devoted themselves to the study of the written law, kept up friendly intercourse with their compatriots in Jerusalem, regularly sent free-will offerings to the temple there, and made occasional pilgrimages thither. In Judea, on the other hand, the fifty-eight years between 516 and 458, which are passed over in silence in the history, do not seem to have been more prosperous than the twenty preceding years of which the record has been preserved. Whether influenced by unfavorable reports of the condition of affairs at Jerusalem, or proceeding upon knowledge personally obtained in some previous visit, Ezra, who had "been directing his heart to seek

the law of the Lord, and to do it, and to teach in Israel statutes and judgments," asked and received in the above-mentioned year the royal authority to make an official visit to Judea. From the terms of his commission we learn that very considerable powers and privileges were at that time conferred upon him. On the first day of the first month of the Jewish year he set out on his westward journey, carrying with him many valuable offerings, and accompanied by some 1,500 of his fellow-countrymen. The first considerable halt was made at the "river of Ahava," a locality which has not been identified as yet (it is called Theras in I. Esdras viii, 41), and here it was found that no Levites had joined the expedition. A message was accordingly sent to a place (now unknown) called Casiphia, where a large colony of them had settled, inviting their assistance. A considerable number of Levites were thus induced to join the party. A fast was thereafter appointed, the sacred treasures were solemnly intrusted to the keeping of twelve priests and twelve Levites, and, deliberately dispensing with the usual military escort, the caravan set out on the twelfth day of the first month, arriving in Jerusalem on the first of the fifth. Here, in the course of the investigation which he had been commissioned to make, Ezra very soon found a field for his reforming activities. He learned that the population generally, priests, Levites, and rulers not excepted, had been intermarrying with the surrounding people to an extent which seemed to threaten the subversion of the true religion, and the obliteration of the Jewish nationality. The unexpected discovery filled him with amazement and shame.

Soon a large number of the inhabitants came to him, and, with Shechaniah for spokesman, assured him that the people at large were willing to dismiss their foreign wives with their children, if only he would take in hand the direction of the matter. With all convenient speed a solemn assembly of all Judah and Jerusalem was then convened, at which, after Ezra had pointed out to the people their transgressions, it was agreed, with only a few dissenting voices, to appoint a committee to inquire into and decide on all the cases of mixed marriage. This committee had finished its work by the beginning of the following year, when a complete list was drawn up of those who had "taken strange wives" and now pledged themselves to put them away. Thus far the Scripture narrative has carried us; but at this point, after detailing the events of precisely one year of Ezra's public life, it abruptly breaks off; nor do we read of him again for the next thirteen years. According to the existing text, in the twentieth (twenty-first?) year of Artaxerxes, on the first day of the seventh month, we find him "in the open space that was before the water-gate," solemnly reading, by public request, in the hearing of all the people, the "book of the law of Moses." One of the immediate effects of this fresh publication of the Mosaic law was that straightway the feast of tabernacles was observed as it had not been "since the days of Joshua the son of Nun;" and very soon afterward a solemn fast was proclaimed, during which a written covenant was drawn up and confirmed by all the people, with Nehemiah at their head, by which they became bound "to walk in God's law which was given by Moses the servant of God," special prominence being given to the following points — separation from the people of the land, strict observance of the Sabbath day and the sabbatic year, punctual payment of the third part of a shekel for the service of the temple, of the first fruits for the priest, and of the tithes for the Levites. And now, once more, after a second period of public activity, which in this case seems to have lasted for little more than a month, the name of Ezra ab-



ruptly disappears from the Scripture narrative. We have no authentic information from any source as to the events of his subsequent life, or as to the time, place, and manner of his death.

EZRA AND NEHEMIAH, BOOKS OF. The two canonical books entitled Ezra and Nehemiah in our English Bibles correspond to the I. and II. Esdras of

the Vulgate, to the II. Esdras and Nehemiah of the LXX., and to the Ezra and Nehemiah of the Masoretic text. Though for many centuries they have thus been treated as separate compositions, we have abundant evidence that they were anciently regarded as forming but one book.



## F.

**F** was the sixth letter of the primitive Greek alphabet.

It represented the sound of our W, *i. e.*, a soft labial. But that sound was unpleasant to the Greek ear, and it began to fall out of use at an early time in all parts of Hellas; it disappeared most completely in the Ionic and in the cognate Attic dialect; it survived longer in the Æolic and the Doric, and it is not improbable that the symbol F may have been written in these dialects after the sound it represented had perished. The grammarians in dealing with this extinct letter gave it the name "digamma" from the shape of the symbol, *i. e.*, a gamma (Γ) with a second horizontal stroke, and they added the name "Æolic" from a mistaken impression that it lingered longer in that dialect than in the Doric. It was from the Doric of Cumæ, as has been already said (see ALPHABET), that the Latins derived the symbols of their alphabet, and F with the others. But though the Latin language contained the sound *w*, it did not seem necessary to have a special symbol to distinguish it from the vowel *u*; and F was used to express quite a different sound, one which the Greek did not possess. This was probably the same sound which the letter still denotes with us—the hard labio-dental (to which V is the corresponding soft sound) produced by pressing the upper teeth on the lower lip, and then letting the breath escape laterally or through the interstices of the teeth. It was quite distinct from *ph*—a distinction which we have sacrificed; *ph* was a *p* followed by a slight breath, not quite so strong as in "up-heave," but very similar. F, in Music, is the fourth note of the natural diatonic scale of C, and stands in proportion to C as four to three, and is a perfect fourth above C as fundamental note. F major, as a key, has one flat at its signature—viz., B flat. F minor has four flats, the same as A flat major, of which it is the relative minor.

FABER, BASIL (1520-1576), a German schoolmaster and theologian, was born at Sorau in Lower Lusatia.

FABER, CECILIA BÖHL VON, the great woman-novelist of Spain, better known by her masculine pseudonym of Fernan Caballero, was born at Morges, Canton de Vaud, in 1797, her parents being then on a tour through Switzerland. Cecilia received a considerable part of her education in Germany at Görslow near Schwerin, where her father had an estate; and here, besides other accomplishments, including a complete mastery of German and Spanish, she acquired a competent knowledge of Latin, English, French, and Italian. In 1813 she returned to Cadiz, and in the following year became the wife of Captain Planells, whom she accompanied to America, where she seems to have spent some years of married life. Not long after the death of her first husband she was married to the Mar-

quis de Arco Hermoso, and in virtue of her exalted station frequently attended the court of Madrid, where she was much admired for her beauty, vivacity, and wit. In 1837 having, by the death of the marquis (1835), been again left a widow, she gave her hand to Señor de Arrom, a member of the bar. This union appears to have been productive of little happiness, and when her husband accepted an appointment as Spanish consul abroad, she decided to remain alone in Seville. It is to the trials and disappointments that came upon her in the later years of her life that the world is indebted for the fascinating works of this distinguished writer, who seems to have been driven to authorship less by any imperious literary instinct than by the necessity she felt for some anodyne against sorrow. Rarely does it happen that literary genius such as she possesses lies dormant for so long a time, unguessed by the world, hardly suspected even by its owner. As early as 1828, indeed, if not earlier, she had committed to writing, in the form of a novel, a tale of peasant life, which she had heard prosaically told under the olive trees of Dos Hermanas, in the neighborhood of Seville, but singularly enough, she had preferred to make use of the German language, and does not appear to have contemplated publication. Although Washington Irving, in the course of one of his visits to Spain, had seen and praised the manuscript, and had encouraged the writer to cultivate literature, and especially Spanish literature, as a serious pursuit, it was not until many years afterward that this first effort, *La Familia de Alvareda*, was presented to the public; nor was it till after her fiftieth year had been passed that she appeared as an author at all, and even then only under an assumed name. Her first, and in some respects her best publication, *La Gaviota* (The Sea Gull), was originally printed in short daily installments in the pages of a Madrid newspaper in 1849. It met with high appreciation in the capital, and was accordingly followed at brief intervals by *Elia*, *Clemencia*, *La Familia de Alvareda*, *Una en Otra*, *Simon Verde*, and other pictures of popular life. Slowly but surely the works of the new writer found their way all over the peninsula, and gradually were translated into French and German, until within ten years she had achieved a European reputation. A collected edition of her works in thirteen volumes was issued from the royal printing press at Madrid in 1859, and about the same time she received an appointment as governess to the royal children. From 1863 to 1868 she occupied rooms in the palace of the Alcazar—the Hampton Court of Seville. At the revolution of 1868 she removed to private apartments in the Calle de Burgos; and though with advancing years her pen became less busy, she continued with unimpaired



faculties to take a keen and kindly, if somewhat needlessly anxious, interest in the important events that were revolutionizing the institutions of her country. Among the numerous schemes of beneficence that busied her, especially in later life, was the promotion of a society for the prevention of cruelty to animals. She was engaged in correcting for the press the last sheets of a compilation of stories, nursery-rhymes, etc., for the use of children, when she died in her eightieth year, on April 7, 1877.

FABER, FREDERICK WILLIAM, a famous hymn writer and theologian, the son of Thomas Henry Faber, secretary to Dr. Barrington, Bishop of Durham, was born June 27, 1814, at Calverley, England, of which place his grandfather, Thomas Faber, was vicar. It is mainly as a hymn writer that he will be known in the future. There is a sweet saintliness, and at the same time a grandeur of thought and a simplicity of poetical expression in Faber's hymns, which we fail to find in much of the Protestant hymnology. Among the finest are—*The Greatness of God, The Will of God, The Eternal Father, The God of My Childhood, Jesus is God, The Pilgrims of the Night, The Land Beyond the Sea, Sweet Saviour! bless us ere we go, I was Wandering and Weary, and The Shadow of the Rock*. The hymns are largely used in Protestant collections. He died September 26, 1863.

FABER, GEORGE STANLEY (1773–1854), an English clergyman, son of Thomas Faber, vicar of Calverley, Yorkshire. He was noted as a preacher.

FABER, or LEFÈVRE, JACOBUS (c. 1450–1536), surnamed Stapulensis, an eminent pioneer of the Protestant movement in France, was born of humble parentage at Etaples in Picardy, France.

FABER, or LEFÈVRE, JOHANN, surnamed from the title of one of his works *Malleus Hæreticorum*, was the son of a smith named Heigerlin, and was born at Leutkirch in Swabia in 1478. At an early age he joined the Dominicans, and he afterward studied theology at Freiburg in Breisgau, where he received the degrees of M.A. and doctor of canon law. His reputation for ability and learning soon led to his being appointed vicar of Lindau and Leutkirch, and shortly afterward canon in the cathedral church of Basel. In 1518 the bishop of Constance named him one of his vicar generals, and Pope Leo X. appointed him to the papal prothonotary. At this time Faber was on friendly footing with the principal German reformers, and sympathized generally with their opinions. Of the many evil customs with which the church had become infected he was well aware, and he was so energetic in opposing the practice of indulgences in his diocese that he was looked upon with suspicion at Rome. He also defended Luther against the attacks of his opponent Eck, although he admitted that many of Luther's views were too far in advance of the times. In 1521, however, Faber made a journey to Rome, which seems to have wrought almost an immediate and complete change in his manner of regarding the efforts of the reformers, for as soon as he returned he began strenuously to oppose them both by speech and writing. In 1523 he appeared as an opponent of Zwingli in a disputation at Zurich, and the same year he published his tractate against Luther entitled *Malleus Hæreticorum*. From this time his chief efforts were devoted either to win back the reformers to the church of Rome, or to get that church to adopt such measures as would best tend to nullify their influence with the people. Among other means employed by him was the establishment of a boarding-house for poor theologians, in order to train a class of preachers fitted by their peculiar qualifications to rival the reformed preachers in popular esteem. In 1526 Faber

became court preacher to the Emperor Ferdinand, and in 1527 and 1528 was sent by him as ambassador to Spain and England. He was chosen Bishop of Vienna in 1531, and died there June 12, 1541.

FABIAN GENS, THE, was said by the genealogists to have been descended from Hercules and a daughter of the Arcadian Evander. Niebuhr's supposition of the Sabine origin of the clan has been held to be inconsistent with the tradition regarding the pre-Sabine institution of the *Lupercalia*, the yearly festival inaugurated at the sacrifice which Romulus and Remus offered in the Lupercal after the death of Amulius, and at which, according to the legend, they agreed to distinguish their respective adherents by the names Quinctilii and Fabii. The two colleges of the Luperci retained these designations long after the members of the two clans ceased to exercise exclusive control over the *sacra*. The chief family names of the Fabian gens or clan, during the commonwealth, were Vibulanus, Ambustus, Maximus, Buteo, Pictor, Dorso, Labeo; and Verrucosus, Rullianus, Gurgus, Eburnus, Æmilianus, Allobrogicus, may be enumerated among their *agnomina*. Vibulanus and the two following names belonged, however, to the same family at different epochs, Q. Fabius Vibulanus, who was consul in 412 B.C., having been the first to assume the cognomen of Ambustus; while Rullianus, according to some accounts, changed the latter into Maximus, in 312 B.C.—his full name thus being Q. Fabius Maximus Rullianus. Of the Vibulani, first noticed about the year 486 B.C., the most distinguished were the three brothers, Quintus, Kæso, and Marcus, one or other of whom filled one of the two consulships from that date to 479. In that year the Fabii—to the number, it is said, of 306 patricians, exclusive of their numerous dependents—emigrated from Rome under the leadership of Kæso, who had just been consul for the third time, and settled on the banks of the Cremera, a few miles above Rome. Some accounts have attributed that secession to the opposition which the Fabian support of the plebs had aroused among the old patrician families. For two years the exiles or seceders continued to be the city's chief defense against the Veientes, until at last they were surprised by the latter, and cut off to a man. The only survivor of the gens was the son of Marcus, who had been left behind at Rome, and who thus became the ancestor of the succeeding Fabii. He was consul in 467 B.C., and a member of the second decemvirate in 450. When the Gauls captured Rome in 390 the pontifex maximus was a Fabius Ambustus. The most famous of this line—*i.e.*, supposing Rullianus to have been the first Maximus—was the father of Rullianus. He was thrice consul, and was dictator in 351 B.C. His son, Rullianus, called by Arnold the "Talbot of the fifth century of Rome," was master of the horse in 365 B.C. to Papirius Cursor, by whom he was degraded for having fought and beaten the Samnites contrary to orders. In 296, when consul for the sixth time, he defeated, at the great battle of Sentinum, the combined forces of the Etrurians, Umbrians, Samnites, and Gauls. But the greatest Roman who bore the name of Fabius—one of the most illustrious Romans of the republic—was Q. Fabius Maximus Verrucosus (see below). Of the later Fabii, Q. Fabius Maximus Æmilianus and Q. Fabius Maximus Allobrogicus were among the most distinguished. The former, a Fabius only by adoption, served in the last Macedonian war, 168 B.C., and was consul in Spain 145 B.C., when he conquered Viriathus. He was the pupil and the patron of the historian Polybius. The Fabius named Allobrogicus (after his victory over the Allobroges and their ally Bituitus, king of the Arverni) was consul in 121



B. C. The Fabian name is occasionally met with as late as the second century A. D.

FABIUS MAXIMUS VERRUCOSUS, QUINTUS, also named *Cunctator* and *Ovicula*, was one of the most distinguished Romans of the republic—the incarnation of all that a Roman meant by patriotism. It appears that he served his first consulship in Liguria, 233 B. C., that he was censor in 230, and consul for the second time in 228. In 218 he was sent to Carthage to inquire whether that state approved of Hannibal's conduct in attacking Saguntum. The answer proved unsatisfactory; and Fabius, assuming the haughty dignity of a Roman senator, and folding up his cloak so as to form a cavity, thus addressed the nobles of Carthage: "Here we bring you peace or war; choose whichever you like." Being answered that he might give which he pleased, he indignantly exclaimed, "Then I give you war;" and the deputies returned to Rome to state the result of their mission. The disastrous campaign on the Trebia, and the defeat on the banks of the Thrasymene Lake, warned the Romans that their successful resistance to Hannibal, and even their existence, depended on the wisdom of the general to whom they intrusted their troops. So Fabius was named dictator in 217, and began his tactics of "masterly inactivity." Maneuvering among the hills, where Hannibal's horses were useless, he cut off his supplies, harassed him incessantly, did everything except fight. His steady adherence to this plan, in spite of all the misconceptions which his caution had aroused at Rome, evinced the moral strength of the man. He was suspected of an ambition for the prolongation of his command. Hannibal was one of the few men in Italy who understood him. Even Minucius, the master of the horse, ridiculed the proceedings of Fabius; and he seized the opportunity of the latter's absence at Rome to attack the enemy, and win a victory. This tended only more strongly to confirm the opponents of Fabius in their opinion, and the command was divided between Minucius and Fabius. The result was exactly such as might have been anticipated. Minucius engaged in battle with Hannibal, and his army was on the verge of ruin when the opportune arrival of Fabius changed the aspect of affairs. Minucius seems to have had the moral courage to confess his folly, and cheerfully to submit to the orders of Fabius. Fabius having retired at the end of the legal time of six months, the conduct of the war was intrusted to Æmilius, who followed the ex-dictator's plan, and Varro, who did not. "You must beware of Varro, as well as of Hannibal," said Fabius; and the warning was followed by the disaster of Cannæ. Fabius might have accused him; but it is narrated that the magnanimous Roman thanked his rival "because he had not despaired of the republic." After the defeat at Cannæ (216 B. C.) he was appointed to the command of the armies with Marcellus, "the sword," as Fabius himself was "the shield," of the republic. He laid siege to the important city of Capua; and when Hannibal marched toward Rome, threatening the city itself, Fabius remained firmly at his post. In 214 B. C., when consul for the fourth time, he captured Casilinum in Samnium. In his fifth consulship, 209, he took the city of Tarentum; and when it was proposed, toward the conclusion of the war, that Scipio should pass into Africa, Fabius was decidedly opposed to the scheme. He did not live to witness the final success of Scipio, having died at an advanced age, 203 B. C. In the previously named year he became *princeps senatus*, a dignity almost hereditary in the family of the Fabii Maximi.

FABIUS PICTOR, QUINTUS, the father of Roman history, was the grandson of the Fabius who, surnamed Pictor for his artistic skill, bequeathed that name to a

family of the Fabian gens. In the interval between the first and second Punic wars we find him taking an active part in the subjugation of the Gauls in the north of Italy (225 B. C.); and after the battle of Cannæ (216), he was employed by the Romans to proceed to Delphi in order to consult the oracle of Apollo. The rude muse of Nævius had already celebrated in verse the glory acquired by the Roman arms in the first Punic war, and Ennius had clothed the annals of his adopted country in the language of poetry. But till the time of Fabius Pictor, no one had appeared to chronicle in simple prose the *res gestæ* of Rome and the Romans. The historian's materials consisted of the *Annales Maximi*, *Commentarii Consulares*, and similar records (see FASTI) of names, feasts, battles, prodigies, and the like, together with such chronicles as every great Roman family preserved of its own deeds; as also—what furnished the most valuable part of his work—his own experiences in the second Punic war. His *Annals*, as they were called, existed in the time of Pliny the Elder, but are now known only from a few fragments and allusions. According to Dionysius, they contained a description of the battle of Thrasymene, and Niebuhr even conjectures that Dion Cassius derived his knowledge of Roman constitutional history from Pictor's work. It seems certain, however, that Fabius wrote his *Annals* in Greek. Polybius expressly asserts this to be the fact; and Cicero's allusion to the Latin prose writer who lived between the time of Cato and that of Piso probably refers to Servius Fabius Pictor.

FABLE. With certain restrictions, the necessity of which will be shown in the course of the article, we may accept the definition which Dr. Johnson proposes in his life of Gay:—"A *fable* or *apologue* seems to be, in its genuine state, a narrative in which beings irrational, and sometimes inanimate, are, for the purpose of moral instruction, feigned to act and speak with human interests and passions." Before tracing the history of the fable we may compare it with its nearest congeners in literature, the myth, the allegory, and the parable. The myth, whether, as is most commonly the case, it has its origin in some physical phenomenon, or can be traced to mistaken metaphor or distorted history, or is merely a play of the imagination, is always the unconscious product of the race, never like the fable invented expressly for a moral or didactic purpose. A closer analogy to the fable is to be found in the literary myth, the artificial product of a later age, such, for instance, as the Litaï of the *Iliad*, the Hesiodic legend of Pandora, or the story of Er in the *Republic* of Plato. Yet these allegorical myths are clearly distinguished from the fable, inasmuch as the story and the moral are intermingled throughout. Between the parable and the fable there is no clear line of distinction. Archbishop Trench insists on two essential differences—first, that the parable teaches spiritual truths, whereas the fable never lifts itself above the earth, and secondly, that the parable never transgresses the actual order of nature. But, though the parables of the New Testament may well be set in a class by themselves, a comparative study of religious writings will show that the parable is one of the commonest forms of religious teaching, and that no hard or fast line can be drawn between moral and spiritual truths. The second difference we should regard as accidental, and it is not altogether borne out by facts.

Most writers on the history of the fable are content to trace its origin to Æsop or the *Panca Tantra* of the mythical Vishnu Sarman, and these are doubtless the oldest collections which have been preserved in writing; but, though we possess no earlier record, we may, from its wide diffusion, regard it as a natural growth of the



imagination, and one of the most primitive forms of literature. It springs from the universal need of men to express their thoughts by concrete images and emblems, and thus is strictly parallel to the use of metaphor in language. Even now fables are made every day, and a quick-witted race like the Arabs will invent fables at every turn as the readiest form of argument.

With the fable, as we know it, the moral is indispensable. As La Fontaine puts it, an apologue is composed of two parts, one of which may be called the body, the other the soul. The body is the fable, the soul the morality. But if we revert to the earliest type we shall find that is no longer the case. In the primitive beast-fable, which is the direct progenitor of the Æsopian fable, the story is told simply for its own sake, and is as innocent of any moral as our fairy tales of Little Red Ridinghood and Jack and the Beanstalk. Thus, in a legend of the Flathead Indians, the Little Wolf found in cloud-land his grandsires, the Spiders, with their grizzled hair and long, crooked nails, and they spun balls of thread to let him down to earth; when he came down and found his wife the Speckled Duck, whom the Old Wolf had taken from him, she fled in confusion, and this is why she lives and dives alone to this very day. Such animal myths are as common in the New World as in the Old, and abound from Finland and Kamtchatka to the Hottentots and Australasians. From the story invented, as the one above quoted, to account for some peculiarity of the animal world, or told as a pure exercise of the imagination, just as a sailor spins a yarn about the sea-serpent, to the moral apologue, the transition is easy; and that it has been effected by savages unaided by the example of higher races seems sufficiently proved. From the beast-fables of savages we come next to the Oriental apologues which are still extant in their original form. The East, the land of myth and legend, is the natural home of the fable, and Hindustan was the birth-place, if not of the original of these tales, at least of the oldest shape in which they still exist. The *Panca Tantra*, or fables of the Brahma Vishnu Sarman, have been translated into almost every language and adapted by most modern fabulists.

From Hindustan the Sanskrit fables passed to China, Thibet, and Persia; and they must have reached Greece at an early age, for many of the fables which passed under the name of Æsop are identical with those of the East. Æsop to us is little more than a name, though, if we may trust a passing notice in Herodotus (ii, 134), he must have lived in the sixth century B.C. Probably his fables were never written down, though several are ascribed to him by Xenophon, Aristotle, Plutarch, and other Greek writers, and Plato represents Socrates as beguiling his last days by versifying such as he remembered. Aristophanes alludes to them as merry tales, and Plato, while excluding the poets from his ideal republic, admits Æsop as a moral teacher. Of the various versions of *Æsop's Fables*, by far the most trustworthy is that of Babrius or Babrias, a Greek of the first century A.D., who rendered them in choliambic verse. These, which were long known in fragments only, were recovered in a MS. found by M. Minas in a monastery on Mount Athos in 1842, and have been edited by Sir G. C. Lewis. An inferior version of the same in Latin iambics was made by Phædrus, a slave of Thracian origin, brought to Rome in the time of Augustus, and manumitted by him, who tells us that he published in senarian verse the rude materials produced by Æsop; but the numerous allusions to contemporary events, as, for example, that to Sejanus in the *Frogs and the Sun*, which brought upon the author disgrace and imprisonment, show that many of them are original or free adaptations.

To sum up the characteristics of the Æsopian fable, it is artless, simple, and transparent. It affects no graces of style, and we hardly need the moral with which each concludes. The moral inculcated is that of worldly wisdom and reasonable self-interest. Æsop is no maker of phrases, but an orator who wishes to gain some point, or induce some course of action. It is the Æsopian type that Aristotle has in view when he treats of the fable as a branch of rhetoric, not of poetry.

If we consider their striking gift of narrative and their love of moralizing, it is strange that the Romans should have produced no body of national fables. But, with the doubtful exception of Phædrus, we possess nothing but solitary fables, such as the famous apologue of Menenius Agrippa to the Plebs, and the exquisite Town Mouse and Country Mouse of Horace's *Satires*.

As the modern languages became by degrees applicable to literary use, fables began to appear in them. A good many still exist in Norman-French, of which may be noted the fables called those of Ysopet, and those composed by Marie de France, the authoress of the well-known fabliaux. Later, also, they were not wanting, though not numerous, in our own tongue. Chaucer has given us one, in his *Nonne Prestre's Tale*, which is an expansion of the fable "Don Coc et don Werpil" of Marie of France; another is Lidgate's tale of *The Churl and the Bird*. But the course of the short and isolated fables through the Middle Ages is not here worth prosecuting.

Several of Odo's tales, like Chaucer's story, can be ultimately traced to a work, or series of works, for the sake of which chiefly the mediæval history of the apologue is interesting—the *History of Reynard the Fox*. This great beast-epic has been referred by Grimm as far back as the tenth century, and is known to us in three forms, each having independent episodes, but all woven upon a common basis. The Latin form is probably the earliest, and the poem *Reinardus et Ysengrimus* dates from the tenth or eleventh century. Next come the German versions. The most ancient, that of a minnesinger Heinrich der Glicheſære (probably a Swabian), was analyzed and edited by Grimm in 1840. In 1498 appeared *Reynke de Voss*, almost a literal version in Low Saxon of the Flemish poem of the twelfth century, *Reinaert de Vos*. Hence the well-known version of Goethe into modern German hexameters was taken. The poem has been well named "an unholy world bible." In it the Æsopian fable received a development which was in several respects quite original. We have here no short and unconnected stories. Materials, partly borrowed from older apologues, but in a much greater proportion new, are worked up into one long and systematic tale, so as to form what has been quaintly called an animal-romance. The moral, so prominent in the fable proper, shrinks so far into the background, that the work might be considered as a mere allegory. Indeed, while the suspicion of its having contained personal satires has been convincingly set aside, some writers deny even the design to represent human conduct at all; and we can scarcely get nearer to its signification than by regarding it as being, in a general way, what Carlyle has called "a parody of human life."

France alone in modern times has attained any pre-eminence in the fable, and this distinction is almost entirely owing to one author. Marie de France in the thirteenth century, Gilles Corrozet, Guillaume Haudent, and Guillaume Gueroult in the sixteenth, are now studied only as precursors of La Fontaine, from whom he may have borrowed a stray hint or the outline of a story. The unique character of his work has given a new word to the French language: other writers of



fables are called *fabulistes*, La Fontaine is named *le fablier*. (See FONTAINE)

The fables of Lessing represent the reaction against the French school of fabulists. "With La Fontaine himself," says Lessing, "I have no quarrel, but against the imitators of La Fontaine I enter my protest." His attention was first called to the fable by Gellert's popular work published in 1746. Gellert's fables were closely modeled after La Fontaine's, and were a vehicle for lively railings against the fair sex, and hits at contemporary follies. Lessing's early essays were in the same style, but his subsequent study of the history and theory of the fable led him to discard his former model as a perversion of later times, and the *Fabeln*, published in 1759, are the outcome of his riper views. Lessing's fables, like all that he wrote, display his vigorous common sense. He has, it is true, little of La Fontaine's *curiosa felicitas*, his sly humor and lightness of touch; and Frenchmen would say that his criticism of La Fontaine is an illustration of the fable of the sour grapes. On the other hand he has the rare power of looking at both sides of a moral problem; he holds a brief for the stupid and the feeble, the ass and the lamb; and in spite of his formal protest against poetical ornament, there is in not a few of his fables a vein of true poetry, as in the *Sheep* and *Jupiter and the Sheep*. But the value of the work is infinitely enhanced by the monograph on the essence of the fable which appeared at the same time, and as an illustration of which the fables were written. Much of the essay is taken up with the refutation of the theories of contemporary fabulists, De la Motte, Richer, Breitinger, Batteux, who only survive in Lessing's pages like the fly in amber. Passing over this negative criticism we may briefly state the results of Lessing's investigations. According to Lessing the ideal fable is that of Æsop. All the elaborations and refinements of later authors, from Phædrus to La Fontaine, are perversions of this original. The fable is essentially a moral precept illustrated by a single example, and it is the lesson thus enforced which gives to the fable its unity and makes it a work of art. The illustrations must be either an actual occurrence or represented as such, because a fictitious case invented *ad hoc* can appeal but feebly to the reader's judgment. Lastly, the fable requires a story or connected chain of events. A single fact will not make a fable, but is only an emblem. We thus arrive at the following definition:—"A fable is a relation of a series of changes which together form a whole. The unity of the fable consists herein, that all the parts lead up to an end, the end for which the fable was invented being the moral precept."

FABRE D'ÉGLANTINÉ, PHILIPPE FRANÇOIS NAZAIRE, a French dramatist and revolutionist, was born at Carcassonne, December 28, 1755. His real name was simple Fabre, the "d'Églantine" being an addition which he adopted in commemoration of his receiving the golden eglantine of Clemence Isaure from the academy of the floral games at Toulouse. After traveling through the provinces as an actor, he came to Paris when about thirty years of age with the intention of continuing the same career, but being ignored by the critics he ventured to take his revenge by a comedy entitled *Les gens des Lettres ou le Provincial à Paris*, and in spite of its failure continued to bring piece after piece on the boards. Shortly after the outbreak of the revolutionary movement he entered the political arena, was chosen by Danton as his private secretary, and obtained from the electors of Paris a place in the National Convention. He distinguished himself by the extravagance of his speeches and measures, voting for the king's death, supporting the *maximum* and the law of the sus-

pected, and giving distorted evidence against the Girondins. On the abolition of the Gregorian calendar he was one of the most active members of the committee intrusted with the formation of the republican substitute, and to him was due a large part of the new nomenclature, with its poetic *Prairial* and *Floreal*, its prosaic *Primidi* and *Duodi*, and its absurd substitution of the names of trees and beasts and implements for those of saints and heroes. The report which he made on the subject on October 24th is not without scientific value. On January 12, 1794, he was arrested by order of the committee of public safety on a charge of malversation and forgery in connection with the affairs of the Compagnie des Indes. During his trial he displayed the greatest apparent nonchalance, sitting in an arm chair, looking out dreamily at the rain, and singing one of his own well-known songs. On his way to the scaffold he distributed his manuscript poems to the people.

FABRETTI, RAPHAEL (1618-1700), a celebrated Italian antiquary, was born at Urbino in Umbria. A younger son, and destined to the pursuit of the law, he studied first at Cagli, and afterward in his native city, where he took the degree of doctor at the age of eighteen years. While in Rome, preparing for practice at the bar, he early attracted the notice of Cardinal Lorenzo Imperiali, who employed him on important and difficult political affairs in Spain. He was named successively treasurer and auditor of the papal legation in that country, where he remained thirteen years. During all this time, however, his favorite classical and antiquarian studies were not neglected; and returning to Rome with the legate, Bonelli, who had been made cardinal, he was able on the journey to make important observations of the relics and monuments of Spain, France, and Italy, and to converse with the many eminent scholars of those countries who afterward corresponded with him. At Rome he was appointed judge of appellation of the Capitol, which post he left to be, under the legate Cardinal Cerri, auditor of the legation at his native city, Urbino. After three years he returned to Rome, on the invitation of Cardinal Carpegna, vicar of Innocent XI., a great lover of antiquities and learning, and now found that fullness of leisure which enabled him to carry on those studies and produce those works which have made him famous. He examined with minute care the monuments and inscriptions of the Campagna. In his solitary expeditions he always rode a horse which his friends nicknamed Marco Polo, after the celebrated Venetian traveler, saying that it could discover half-hidden monuments by smelling only, and thus frequently led its master to notice what he would otherwise have passed by. Fabretti was delighted with the name, and used it himself in a letter on the study of antiquity, still in manuscript. By Innocent XII. Fabretti was made keeper of the archives of the castle St. Angelo, a charge of great responsibility and trust, which he retained till his death.

FABRIANO, a town of central Italy, province of Ancona, is situated at the foot of the Apennines, and on the railway from Ancona to Rome, thirty-five miles southwest of Ancona.

FABRIANO, GENTILE DA, an Italian painter, was born at Fabriano about 1370. He is said to have been a pupil of Allegretto di Nuzio, but there is every probability that he received most of his early instruction from Fra Giovanni, surnamed Angelico, to whose manner his bears in some respects a close similarity. About 1411 he went to Venice, where by order of the doge and senate he was engaged to adorn the great hall of the ducal palace with frescoes from the life of Barbarossa. He executed this work so entirely to the satisfaction of his employers that they granted him a pension for life, and accorded him the privilege of wearing the habit of



a Venetian noble. About 1422 he went to Florence, where in 1423 he painted an *Adoration of the Kings* for the church of Santa Trinita, which is preserved in the Florence gallery of paintings, and is considered his best work now extant. To the same period belongs a *Madonna and Child*, which is now in the Berlin Museum. Fabriano had by this time attained a wide reputation, and was engaged to paint pictures for various churches, more particularly Siena, Perugia, Gubbio and Fabriano. About 1426 he was called to Rome by Martin V. to adorn the church of St. John Lateran with frescoes from the life of John the Baptist. He also executed a portrait of the pope, attended by ten cardinals, and in the church of St. Francesco Romano a painting of the *Virgin and Child*, attended by St. Benedict and St. Joseph, which was much esteemed by Michelangelo, but is no longer in existence. Fabriano died about 1450.

FABRICIUS, CAIUS LUCINUS, a Roman general and consul, was perhaps the first member of the Fabricia gens who settled in Rome. He makes his earliest appearance in history as one of the ambassadors sent to the Tarentines to dissuade them from making war on the Romans. Elected consul in 282 B.C., he in the same year defeated the Boii and the Etruscans. When in the following year the Romans were defeated by Pyrrhus, Fabricius was sent to treat for the ransom and exchange of the prisoners, and Pyrrhus endeavored unsuccessfully to bribe him with large offers to enter his service. In 278 Fabricius was elected consul for the second time, and was successful in negotiating terms of peace with Pyrrhus, who sailed away to Italy. Fabricius afterward gained a series of victories over the Samnites, the Lucanians, and the Bruttii, and on his return to Rome received the honor of a triumph. Notwithstanding the offices he had filled he died poor, and provision had to be made for his daughter out of the funds of the state. In honor of his military achievements and his incorruptible integrity, the senate also decreed that he and his descendants should have a burial place inside the city.

FABRICIUS, GEORGE (1516-1571), poet, historian, and archæologist, was born at Chemnitz, in Upper Saxony.

FABRICIUS, HIERONYMUS (1537-1619), a celebrated Italian anatomist and surgeon, was surnamed Acquapendente from the episcopal city of that name, where he was born.

FABRICIUS, JOANNES ALBERTUS (1668-1736), one of the most learned, laborious, and useful of bibliographers, was born at Leipsic.

FABRICIUS, JOHANN CHRISTIAN (1745-1808), one of the chief founders of scientific entomology, was born at Tondern in Schleswig.

FABRONI, ANGELO (1732-1803), a celebrated Italian biographer, was born at Morradi, Tuscany.

FABROT, CHARLES ANNIBAL (1580-1659), a French jurisconsult, was born at Aix in Provence.

FABYAN, ROBERT, an English chronicler, sprung from an Essex family, is said by Bishop Tanner to have been born in London about the middle of the fifteenth century. Even the date of his death, 1512, is an inference from that upon which his will was proved, namely, July 12, 1513.

FACADE (Fr.), the exterior front or face of a building. The term, although frequently restricted to classic architecture, may be applied to the front elevation of a building in any style. It is, however, generally used with reference to buildings of some magnitude and pretensions; thus, we speak of the front of a house, and the façade of a palace. The back elevation of an important building is called the rear façade.

FACCIOLATI, JACOPO, was born at Toriggia, in

the province of Padua, in 1682. He owed his admission to the Seminary of Padua to Cardinal Barberigo, who had formed a high opinion of the boy's talents. As professor of logic, and regent of the schools, Facciolati was the ornament of the Paduan university during a period of forty-five years. He published improved editions of several philological works, such as the *The-saurus Ciceronianus* of Nizolius, and the polyglot vocabulary known under the name of Calepino. The latter work, in which he was assisted by his pupil, Forcellini, he completed in four years—1715 to 1719. It was written in seven languages, and suggested to the editor the idea of his *opus magnum*, the *Totius Latinitatis Lexicon*, four volumes, folio, Padua, 1771. He died in 1769.

FACTORS, in mercantile law, are agents intrusted with goods for the purpose of sale. The general rule as to sales at common law is that no person but the true owner can give a title to a purchaser. If, therefore, a factor or any similar kind of agent, being in possession of goods belonging to his principal, dealt with them in any unauthorized way, the persons dealing with him acquire no right as against the real owner. The inconvenience and injustice of this rule are apparent. A merchant *bona fide* buying goods from a person who was in possession of them, and had what among mercantile men are called the documents of title, was liable to have his rights defeated by the appearance of the real owner, who repudiated the transaction and recovered the goods. Or an agent might pledge the goods intrusted to him for advances made to him in good faith on that security, and the unfortunate lender might find that the goods belonged to a principal, and that he had no security for his loan.

FACTORY ACTS, a series of acts adopted by the English Parliament at various dates from 1802 to 1878, and subsequently, asserting the right of the State to control the industrial organizations which depend upon the labor of women and children. The immediate cause of the passing of the bill of 1802 was the fearful spread throughout the factory district of Manchester of epidemic diseases, which made dreadful havoc among the youthful laboring population on account of their scanty mode of living, and peculiar way of working. In the United States the employment of children in manufacturing industries, and in other capacities, is prohibited or regulated by municipal ordinance or State legislation.

FACULTY, in law, is a dispensation or license to do that which is not permitted by the common law. The word in this sense is used only in ecclesiastical law.

In universities and other learned bodies faculty means the association of professors or practitioners of some special branch of learning or skill. Thus, in the Scotch universities we have the usual faculties of art, medicine, divinity, and law.

FAENZA, a city of Italy, at the head of a circondario in the province of Ravenna, situated in a fertile plain about twenty miles southwest of Ravenna, at the junction of the Zanella canal with the Lamone (the ancient Anemo), and on the railway between Bologna and Ancona. It is regularly built, surrounded by walls, and defended by a citadel. Around the market-place (a spacious square in the center of the town with a fine marble fountain) are arranged the cathedral (St. Constantius), the town-hall, the theater, and many handsome residences. Population, 43,500.

FÆSULÆ. See FIESOLE.

FAHLCRANTZ, CHRISTIAN ERIK (1790-1866), a Swedish author, was born at Stora Tuna, in Sweden.

FAHRENHEIT, GABRIEL DANIEL, well known for the improvements made by him in the construction of the thermometer and barometer, was born at Dantzic,



May 14, 1686. He early relinquished trade for the study of natural philosophy; and, after having traveled in Germany and England, he settled in Holland, where Gravesande and other men of science were his teachers and friends. In 1714 he conceived the idea of substituting mercury for spirits of wine in the construction of thermometers. He took as the zero of his thermometric scale the lowest temperature observed by him at Dantzic during the winter of 1709, which he found was that produced by mixing equal quantities of snow and sal-ammoniac. The space between this point and that to which the mercury rose at the temperature of boiling water he divided into 212 parts. At the time of his death, which took place on September 16, 1736, Fahrenheit was engaged in the contrivance of a machine for draining inundated land. See THERMOMETER and METEOROLOGY.

**FAIR.** A fair is defined as a "greater species of market recurring at more distant intervals;" both have been distinguished by Lord Coke from "mart," which he considers as a greater species of fair; and all three may comprehensively be described as customary or legalized public places for the sale of commodities (including labor). Thus, in England, no fair can be held without a grant from the sovereign, or prescription which presupposes such grant. In France, the establishment and abolition of fairs—with the exception of cattle markets and the markets of the metropolis—are generally left to the discretion of the departmental prefects. The most commonly accepted derivation of the word fair is from *feriæ*, a name which the Church borrowed from Roman custom and applied to festivals.

*American Fairs.*—The word fair, as now used in the United States, appears to have completely lost its Old World meaning. It seems to be exclusively applied to industrial exhibitions, and to what in England would be called fancy bazaars. Thus, during the civil war, large sums were collected at the "sanitary fairs," for the benefit of the sick and wounded. To the first named class belong the state and county fairs, as they are called. Among the first and best known of these was the "New York World's Fair," opened in 1853 by a company formed in 1851. Since 1829 the "American Institute" held annual "fairs."

The holding of an International Exposition in the United States in 1892, to commemorate the four-hundredth anniversary of the discovery of America, was first mooted by citizens of Chicago during 1888. Meetings were held in that city and elsewhere, at which it was determined to bring the matter to the attention of Congress. An impetus was given to the proposed undertaking by citizens in all portions of the country, and during the first session of the fifty-first Congress a bill was introduced, providing for the holding of a "world's fair" at such place in the United States as should thereafter be decided upon. After a prolonged debate the question was determined in favor of Chicago, the year 1893 being designated as the date. During the summer of 1890 meetings of the several committees were held at Chicago, at which the executive board of the national committee was chosen and the site for the fair agreed upon.

**FAIRBAIRN, SIR WILLIAM, BARONET** (1789-1874), a distinguished mechanical engineer, was born at Kelso, Roxburghshire, Scotland.

**FAIRFAX, EDWARD**, the most poetical of all the translators of Tasso, was born in Yorkshire, England, about 1580, and is supposed to have died in 1632.

**FAIRFAX, THOMAS, THIRD LORD**, better known as Sir Thomas Fairfax, the eminent parliamentary general and commander-in-chief during the civil wars, was the eldest son of Sir Ferdinando (afterward Lord) Fairfax,

by Mary, daughter of Lord Sheffield, president of the North, and was born at Denton, on the banks of the Wharfe, near Otley, Yorkshire, on January 17, 1611-12. He studied at St. John's College, Cambridge, about four years (1626-30), and then proceeded to Holland to serve as a volunteer with the English army in the Low Countries under Lord Vere of Tilbury. This connection led to one still closer; in the summer of 1637 Fairfax married Anne, daughter of Lord Vere, a lady of spirit, whom Mr. Carlyle characterizes as "a Vere of the fighting Veres and given to Presbyterianism." The Fairfaxes, though serving at first under Charles I., were opposed to the arbitrary prerogative of the crown, and Sir Thomas (he had been knighted by Charles in 1640) declared that "his judgment was for the parliament as the king and kingdom's great and safest council." When Charles endeavored to raise a guard for his own person at York, intending it, as the event afterward proved, to form the nucleus of an army, Fairfax was employed to present a petition to his sovereign, entreating him to hearken to the voice of his parliament, and to discontinue the raising of troops. This was at a great meeting of the freeholders and farmers of Yorkshire convened by the king on Heyworth Moor near York. Charles evaded receiving the petition, pressing his horse forward, but Fairfax followed him and placed the petition on the pommel of the king's saddle. The incident is typical of the times and of the actors in the scene. War broke out, Lord Fairfax was appointed general of the parliamentary forces in the north, and his son, Sir Thomas, was made general of the horse under him. Both father and son distinguished themselves in the campaigns in Yorkshire. At first the parliamentary troops were not successful. The cavalier spirit of honor and high-bred loyalty was too much, as Cromwell said, for poor tapsters and town-apprentice people. There was little hope of success until men of strong religious feelings could be brought into the field against them, and this was effected by Oliver and his Ironsides, his invulnerable troop of disciplined horsemen. In the beginning of 1644 the Scottish army under the command of the Earl of Leven joined the parliamentary forces, and after some minor engagements commenced the siege of York, then invested by the Marquis of Newcastle. York was considered the second town of England, and upon its preservation Charles believed that the safety of his crown mainly depended. There were several assaults and sallies, but news having arrived that Prince Rupert was marching to raise the siege with 20,000 men, the besieging generals, Leven, Fairfax, and Manchester, resolved to draw off their troops, and encamp on the moor seven miles west of York. On July 2, 1644, was fought the important battle of Marston Moor, which virtually decided the fate of the war. The gallantry of the troopers led by the old Earl of Leven, Manchester, and Fairfax, was conspicuous. Fairfax was severely wounded, and he lost a brother in the action. The victory was so decisive that the Marquis of Newcastle fled the kingdom, and the Royalists abandoned all hope of retrieving their affairs. The city of York was taken, and nearly the whole north submitted to the parliament.

In the south and west of England, however, the Royalist cause was still active. The war had lasted two years, and the nation began to complain of the contributions that were exacted and the excesses that were committed by the military. Dissatisfaction was expressed with the military commanders, Essex and Manchester, and as a preliminary step to reform, the self-denying ordinance was passed. This Act took from all members of parliament their commands in the army or their civil employments. The Earl of Essex was removed



from the supreme command, and Sir Thomas Fairfax appointed his successor. Cromwell, as a member of the House of Commons, was excluded by the ordinance, but he was too important to be dispensed with; he was made lieutenant-general under Fairfax. The army was new modeled, incompetent officers were dismissed, and the regiments completed by more select levies. The hostile armies met on June 14, 1645, at Naseby in Northamptonshire, and a decisive battle took place, which ended in the total discomfiture of the Royalists. The king himself was in the field. The king fled to Wales. Fairfax besieged Leicester, and was successful at Taunton, Bridgewater, and Bristol. The whole west was soon reduced to obedience. The king had returned from Wales and established himself at Oxford, where there was a strong garrison, but danger was too apparent; the vacillating monarch withdrew secretly, and proceeded to Newark to throw himself into the arms of the Scots. Oxford capitulated; and by the end of September Charles had neither army nor garrison in England.

Fairfax arrived in London on November 12, 1645. In his progress toward the capital he was accompanied by applauding crowds. Complimentary speeches and thanks were presented to him by both houses of parliament, along with a jewel of great value set with diamonds, and a sum of money. Charles was delivered up to the commissioners of parliament by the Scots in January, 1646. He had voluntarily surrendered himself to the Scots army, and they negotiated with the parliamentary leaders in his favor. There was a debt of £600,000, arrears of pay, owing to the Scots, but they agreed to take £400,000, one half of which was to be paid before the army left England. The bargain was concluded some months before there was any stipulation to deliver up the king, but probably, as Hallam remarks, the parliament would never have actually paid the money on any other consideration than the delivering of the king's person. The transaction was naturally seized upon by the Royalists and the Cavalier wits and poets, as a subject of obloquy and reproach to the Scots commissioners, and, by implication, to the whole Scottish nation.

Charles was delivered up to the commissioners of parliament January 30, 1646-7. Fairfax, who preceded the king, having met him beyond Nottingham, dismounted from his horse, kissed the royal hand, and having resumed his seat, discoursed with the unfortunate prince during the journey to Holdenby. "The general," said Charles, "is a man of honor, and keeps his word which he had pledged to me." His chivalrous courtesy is of a piece with his whole character.

The agitation in the army now became formidable, and threatened anarchy. The Independents were too powerful for both parliament and Presbyterians. Fairfax resolved to resign his commission as commander-in-chief, but he was persuaded to retain it, and was passive, if not coöperating, in all the proceedings of the army which had for their object to destroy the power of parliament. Lord Ferdinando Fairfax died in the spring of 1647, and Sir Thomas succeeded to his title and to his office as governor of Hull. A second civil war broke out in the summer of 1648; a Scots army of 40,000 was raised to deliver the king from the "sectaries;" there were tumults in England and in Wales. Fairfax displayed the greatest activity in putting down these insurrections, and took Colchester, whither the royalist army had betaken themselves. It was at this time, when the commander-in-chief was besieging Colchester, that Milton addressed to him the sonnet:—

"Fairfax, whose name in arms through Europe rings,  
Filling each mouth with envy or with praise."

The poet eulogizes the brave soldier for "firm unshaken

virtue," but he hesitated to go along with the army and Independents in the trial of the king. He was placed at the head of the judges before whom Charles was arraigned, but he refused to act. In calling over the court, when the crier pronounced the name of Fairfax, a lady in the gallery called out "that the Lord Fairfax was not there in person, that he would never sit among them, and that they did him wrong to name him as a commissioner." This was Lady Fairfax, who could not forbear, as Whitelock says, to exclaim aloud against the proceedings of the High Court of Justice. The decision of the court was a grievous error. "When living, Charles was a baffled tyrant," as Lord John Russell has remarked; "when dead he became a royal martyr." In June, 1650, after the Scots had declared for Charles II., the council of state resolved to send an army to Scotland in order to prevent an invasion of England. Fairfax declined to act against the Presbyterian Scots, and resigned his commission. Cromwell was appointed his successor, "captain-general and commander-in-chief of all the forces raised or to be raised by authority of parliament within the commonwealth of England." Fairfax received a pension of £5,000 a year, and is no more heard of till after the death of the triumphant Protector.

When Monk invited him to assist in the operations about to be taken against Lambert's army, he promptly obeyed the call, and in December, 1659, appeared at the head of a body of Yorkshire gentlemen; and such was the influence of Fairfax's name and reputation that the Irish brigade, consisting of 1,200 horse, quitted Lambert's colors and joined him. This was speedily followed by the breaking up of all Lambert's forces, and that day secured the restoration of the monarchy. A "free" parliament was called; Fairfax was elected member for Yorkshire, and was put at the head of the commission appointed by the House of Commons to wait upon Charles II. at the Hague and urge his speedy return. Of course the "merry monarch, scandalous and poor," was glad to obey the summons, and Fairfax provided the horse on which Charles rode at his coronation. The remaining eleven years of the life of Lord Fairfax was spent in retirement at his seat in Yorkshire. He must, like Milton, have been sorely grieved and shocked by the scenes that followed — the brutal indignities offered to the remains of his companions in arms, Cromwell and Ireton, the sacrifice of Sir Harry Vane, the neglect or desecration of all that was great, noble, or graceful in England, and the flood of immorality which, flowing from Whitehall, sapped the foundations of the national strength and honor. Lord Fairfax died at Nunappleton on November 12, 1671.

FAIRFIELD, a town and port of entry of Fairfield county, Connecticut, is situated near Long Island Sound, and on the New York and New Haven Railroad, twenty-two miles southwest of New Haven. It consists chiefly of one spacious street of new and handsome buildings. The beautiful scenery and fine sea air of the neighborhood attract to the town a considerable number of summer visitors, but its prosperity depends chiefly on its shipping trade. About one and a half miles southeast from the town is Black Rock, one of the finest harbors of the state. Fairfield was settled in 1659. In 1779 it was burned by the British under Governor Tryon. Population, 4,000.

FAIRHOLT, FREDERICK WILLIAM (1813-1866), a most industrious antiquary, draughtsman, and editor of our older literature, was born in London.

FAIRIES. In early times, when so much of the energy of man was not, as now, applied to practice, it seems to have found a natural outlet in imagination. Of all the minor creations of mythology, the fairies are the most beautiful, the most numerous, the most men-



orable in literature. Like all organic growths, whether of nature or of the fancy, they are not the immediate product of one country or of one time; they have a pedigree, and the question of their ancestry and filiation is one of wide bearing and weighty side-issues. But mixture and connection of races have in this, as in many other cases, so changed the original folk-product that it is difficult to disengage and separate the different strains that have gone to the making or molding of the result as we have it. Certain points, however, in the course and development of the superstition can be definitely placed.

The character of the religion by the people of Gaul was undoubtedly much changed by the Roman occupation, but, in inscriptions and legends, traces are to be found of what the primitive belief was, which faintly shadow out that primitive belief, and it is here that we first find traces of one of the various classes of beings which have in latter times received the general name of fairies. Votive inscriptions to supernatural beings, corresponding to the nymphs and fauns of classic mythology, have been found on Gaulish and German soil repeatedly.

The similarity of these beings to the fays that play so important a part in mediæval romances is remarkable. These fays preside at the birth and influence the destiny of men, taking individuals under their special protection. They take lovers from among men, and are often described as of delicate, unearthly, ravishing beauty. The enjoyment of their charm is, however, generally qualified by some restriction or compact, the breaking of which is the cause of calamity to the lover and all his race, as in the notable tale of Melusine.

The Gauls had no doubt a populous pantheon. The peasants seem to have offered worship to, and peopled the old hills, trees, rocks, streams, and springs with, beings similar to the nymphs and fauns of antiquity. And each little locality seems to have had its protecting deities, female, and generally three in number. The coming of Christianity only changed slightly the way of regarding these creatures—did not by any means overcome the superstition. It is most likely to the similarity in character and function of these local deities to the Parcæ or Fates of antiquity that we owe the name generally given to all the different beings, a great part of whose functions it was to preside at the birth and rule the destiny of man.

FAITHORNE, WILLIAM, a painter and engraver, was born in London, at what date was uncertain, but most probably either 1626 or 1627. He was apprenticed to Robert Peake, a painter and printseller, who received the honor of knighthood from Charles I. On the outbreak of the civil war he accompanied his master into the king's service, and being made prisoner at Basinghouse, he was confined for some time in Aldersgate, where, however, he was permitted to follow his profession of engraver, and among other portraits did a small one of the first Villiers, Duke of Buckingham. At the earnest solicitation of his friends he very soon regained his liberty, but only on condition of retiring to France. There he was so fortunate as to receive instructions from Robert Nanteuil, by which his style was greatly benefited. He was permitted to return to England about 1650, and took up a shop near Temple Bar, where, beside his work as an engraver, he carried on a large business as a printseller. In 1680 he gave up his shop and retired to a house in Blackfriars, occupying himself chiefly in painting portraits, from the life, in crayons, although still occasionally engaged in engraving. He died of a lingering consumption, May 13, 1691.

FAITHORNE, WILLIAM (1656-1686), a mezzotinto engraver, son of the former.

FAIZÁBÁD, a division or commissionership of Oudh in British India, now under the jurisdiction of the lieutenant-governor of the North-Western Provinces. It comprises the three districts of Faizábád, Gondá, and Bharaich. It is bounded on the north by the independent state of Nepál, on the east by Gorakhpur district, on the south by Azimgarh and Sultánpur, and on the west by Bára Banki, Sitápur, and Kheri. Population, Hindus, 3,028,502; Mahometans and others, 350,760; total, 3,379,262, of whom 1,747,411 were males, and 1,631,851 females. Number of villages or townships, 8,452. Area, 7,671 square miles.

FAIZÁBÁD, a district of British India in Oudh, under the lieutenant-governor of the North-Western Provinces, is bounded on the north and east by the Gogra River, on the south by Azimgarh district, and on the west by the Gumti River. The area, according to the latest estimate in 1877, is 1,649 square miles, and the population 1,024,092 souls. Faizábád forms a very historical district, lying between the two great rivers of Oudh, and is interesting alike for its calamities and its ruins. Ajodhyá, the capital of the ancient kingdom of Oudh, which plays so conspicuous a part in the Sanskrit epics, lies in its northern angle, close to the present city of Faizábád. In more modern times the district was the center of the nawáb vizir's influence, and contained his capital until the removal of his court to Lucknow in 1775. Since the mutiny, the district has settled down into a peaceful part of the British Empire, with an increasing population.

FAIZÁBÁD, the chief town and administrative headquarters of the district of the same name, situated on the right or south bank of the Gogra. Adjacent to Faizábád on the east, and now forming a suburb of the town, is Ajodhyá, the ancient capital of King Daswratha, the father of Ráma, the hero of the Rámáyana. Of this ancient city, said to have covered an area of forty-eight kos, now hardly a trace remains.

FAKIR. See DERVISH.

FALABA, a town of West Africa, about 190 miles northwest of Freetown, in Sierra Leone, at the foot of the Konkodugor, and on the Fala River, a tributary of the Little Scarcies.

FALAISE, a town of France, the capital of an arrondissement in the department of Calvados, is situated on the right bank of the Ante, twenty-one miles south by east of Caen.

FALASHAS (*i.e.*, Exiles), the degenerate Jews of Abyssinia, found in considerable numbers in the provinces west of Takazze, namely, Semien, Wogara, Armatshoho, Walkait, Tchelga, Dembea, Tenkel, Dagusa, Alafa, Kunsula, Aschafer, Agarv-Meder, and Quara. It is doubtful whether they are to be ethnologically identified with the seed of Abraham, or regarded, like the Khazars of the eighth century, as, for the most part, mere proselytes to Judaism. As to the date when the race or the religion was introduced there is no authentic information—one account carrying it back to the days of Solomon and his hypothetical son Menelek by the Queen of Sheba, another to the time of the Babylonian captivity, and a third only to the first century of the Christian era.

FALCON, a word now restricted to the high-couraged and long-winged Birds-of-Prey which take their quarry as it moves; but formerly it had a very different meaning, being by the naturalists of the last, and even of the present century, extended to a great number of birds comprised in the genus *Falco* of Linnæus and writers of his day, while, on the other hand, by falconers, it was, and still is, technically limited to the *female* of the birds employed by them in their vocation (see



FALCONRY), whether "long-winged," and therefore "noble," or "short-winged," and "ignoble."

According to modern usage, the majority of the Falcons, in the sense first given, may be separated into *five* very distinct groups: — (1) the Falcons pure and simple (*Falco* proper); (2) the large northern Falcons (*Hierofalco*, Cuvier); (3) the "Desert Falcons" (*Gennæa*, Kaup); (4) the Merlins (*Æsalon*, Kaup); and (5) the Hobbies (*Hypotriorchis*, Boie).

FALCONE, ANIELLO (1600), a battle-painter, was the son of a tradesman, and was born in Naples. He became, as a battle-painter, almost as celebrated as Borgognone (Courtois), and was named "L'Oracolo delle Battaglie." His works have animation, variety, truth to nature, and careful color. Falcone was bold, generous, used to arms, and an excellent fencer. In the insurrection of Masaniello (1647) he resolved to be bloodily avenged for the death, at the hands of two Spaniards, of a nephew, and of a pupil in the school of art which he had established in Naples. He and many of his scholars, including Salvator Rosa and Carlo Coppola, formed an armed band named the Compagnia della Morte. They scoured the streets by day, exulting in slaughter; at night they were painters again, and handled the brush with impetuous zeal. Peace being restored, they had to decamp. Falcone and Rosa made off to Rome; here Borgognone noticed the works of Falcone, and became his friend, and a French gentleman induced him to go to France, where Louis XIV. became one of his patrons. Ultimately Colbert obtained permission for the painter to return to Naples, and there he died in 1665.

FALCONER, HUGH, a distinguished palæontologist and botanist, descended from an old Scotch family, was born at Forbes, February 29, 1808. In 1826 he graduated as M.A. at Aberdeen, where he began to manifest a decided taste for the study of natural history and botany. He afterward studied medicine in the university of Edinburgh, taking the degree of M.D. in 1829. Proceeding to India in 1830 as assistant-surgeon on the Bengal establishment of the East India Company, he made, on his arrival, an examination of the fossil bones from Ava, in the possession of the Asiatic Society of Bengal, and a description of the collection, which he published immediately, gave him a recognized position among the scientists of India.

In 1834 Falconer was appointed to inquire into the fitness of India for the growth of the tea-plant, and it was on his recommendation that it was introduced into that country. Being compelled by the state of his health to leave India in 1855, he spent the remainder of his life chiefly in examining fossil species in England and the Continent corresponding to those which he had discovered in India. In the course of his researches he became interested in the question of the antiquity of the human race, and actually commenced a work on *Præval Man*, which, however, he was not spared to finish. He died January 31, 1865.

FALCONER, WILLIAM, the greatest English naval poet — Charles Dibdin taking rank as second — was born in Edinburgh, February 11, 1732. He served on board a Leith merchant vessel, and in his eighteenth year was fortunate enough to obtain the appointment of second mate of the *Britannia*, a vessel employed in the Levant trade, and sailed from Alexandria for Venice. The *Britannia* was overtaken by a dreadful storm off Cape Colonna and was wrecked, only three of the crew being saved. Falconer was happily one of the three, and the incidents of the voyage and its disastrous termination formed the subject of his poem of *The Shipwreck*. "In all Attica," says Byron, "if we except Athens itself and Marathon, there is no scene more in-

teresting than Cape Colonna. To the antiquary and artist, the sixteen columns\* are an inexhaustible source of observation and design; to the philosopher the supposed scene of Plato's conversations will not be unwelcome; and the traveler will be struck with the beauty of the prospect over 'isles that crown the Ægean deep.'"

After the wreck of the *Britannia* and his return to England, Falconer, in his nineteenth year, appeared as a poet. He printed at Edinburgh an elegy on Frederick, Prince of Wales — a puerile inflated performance — and afterward contributed short pieces to the *Gentleman's Magazine*. Falconer continued in the merchant service until the spring of 1762, when he gained the patronage of Edward, Duke of York, by dedicating to him his poem of *The Shipwreck*, which appeared in May of that year, "printed for the author." The duke advised him to enter the royal navy, and before the end of the summer the poet-sailor was rated as a midshipman on board the *Royal George*. In 1764 he published a new edition of *The Shipwreck*, corrected and enlarged, and printed, not for the author, as in the former instance, but for Andrew Millar, the publisher of Hume and Robertson, and whom Johnson called the Mæcenæ of the age. About nine hundred lines were added to this new edition of the poem, including what may be termed its character-painting and elaborated description and episodes. In the same year, 1764, Falconer published a political satire, a virulent rhyming tirade against Wilkes and Churchill, entitled *The Demagogue*; and in 1769 appeared his *Universal Marine Dictionary*, an elaborate and valuable work. While engaged on this dictionary, Mr. Murray, a bookseller in Fleet Street, father of Byron's munificent publisher and correspondent, wished him to join him as a partner in business. The poet declined the offer, probably because his dictionary was then near completion, and he might reasonably anticipate from its publication some favorable naval appointment. He did receive this reward; he was appointed purser of the *Aurora* frigate, which had been commissioned to carry out to India certain supervisors or superintendents of the East India Company. Besides his nomination as purser, Falconer was promised the post of private secretary to the commissioners. Before sailing he published a third edition of his *Shipwreck*, which had again undergone "correction" but not improvement. Mr. Stanier Clarke conceived that the poet, in his agitation and joy on being appointed to the *Aurora*, had neglected this edition, and left the last alterations to his friend Mallet; but Mallet had then been more than four years in his grave, and Falconer, in the "advertisement" which he prefixed to the volume, and which is dated from Somerset House, October 1, 1769, said he had been encouraged by the favorable reception the poem had met with to give it "a strict and thorough revision." The day after this announcement the poet sailed in the *Aurora* from Spithead. The vessel arrived safely at the Cape of Good Hope, and having passed a fortnight there, left on December 27th. She was never more heard of, having, as is supposed, foundered at sea. Thus miserably perished William Falconer in the thirty-seventh year of his age.

FALCONET, ETIENNE MAURICE, a French sculptor, was born at Paris in 1716. His parents were poor, and he was at first apprenticed to a carpenter, but some of his clay figures, with the making of which he occupied his leisure hours, having attracted the notice of Lemoine, that sculptor made him his pupil. While diligently prosecuting his profession he found time to study Greek and Latin, and also wrote several *brochures* on art, in which many names both ancient and modern of great reputation are treated in a remarkably disparaging

\*Columns of an ancient temple of Minerva.



way. His artistic productions are characterized by the same defects as his writings, for though manifesting considerable cleverness and some power of imagination, they display in many cases a false and fantastic taste, the result most probably of an excessive striving after originality. One of his most successful statues was one of Milo of Crotona, which secured his admission to the membership of the Academy of Fine Arts. Many of his works, being placed in churches, were destroyed at the time of the French Revolution. At the invitation of the Empress Catherine he went to St. Petersburg, where he executed a colossal statue of Peter the Great in bronze. On his return to Paris in 1788, he became director of the French Academy of Painting. He died January 4, 1791.

FALCONRY, the art of employing falcons and hawks in the chase—a sport the practice of which is usually termed hawking. Falconry was for many ages of the Old World's history one of the principal sports. Probably it may be considered as having been always as purely a sport as it is at the present day; for even in the rudest times man must have been possessed of means and appliances for the capture of wild birds and beasts more effectual than the agency of hawks, notwithstanding the high rate of efficiency to which, as we may still see, well-trained hawks may be brought. The antiquity of falconry is very great. It seems impossible to fix the exact period of its first appearance. There appears to be little doubt that it was practiced in Asia at a very remote period, for which we have the concurrent testimony of various Chinese and Japanese works, some of the latter being most quaintly and yet spiritedly illustrated. It appears to have been known in China some 2,000 years B.C., and the records of a King Wen Wang, who reigned over a province of that country 689 B.C., prove that the art was at that time in very high favor. In Japan it appears to have been known at least 600 years B.C., and probably at an equally early date in India, Arabia, Persia, and Syria. Sir A. H. Layard, as we learn from his work on *Nineveh and Babylon*, considers that in a bas-relief found by him in the ruins of Khorsabad "there appeared to be a falconer bearing a hawk on his wrist," from which it would appear to have been known there some 1,700 years B.C. In all the above-mentioned countries of Asia it is practiced at the present day.

Little is known of the early history of falconry in Africa, but from very ancient Egyptian carvings and drawings it seems to have been known there many ages ago. It was probably also in vogue in the countries of Morocco, Oran, Algiers, Tunis, and Egypt, at the same time as in Europe. The older writers on falconry, English and Continental, often mention Barbary and Tunisian falcons. It is still practiced in Africa; the present writer has visited two hawking establishments in Egypt.

Perhaps the oldest records of falconry in Europe are supplied by the writings of Pliny, Aristotle, and Martial. Although their notices of the sport are slight and somewhat vague, yet they are quite sufficient to show clearly that it was practiced in their days—between the years 384 B.C. and 40 A.D. It was probably introduced into England from the Continent about 860 A.D., and from that time down to the middle of the seventeenth century falconry was followed with an ardor that perhaps no sport in our country has ever called forth, not even our grand national sport of fox-hunting. Stringent laws and enactments, notably in the reigns of William the Conqueror, Edward III., Henry VIII., and Elizabeth, were passed from time to time in its interest. Falcons and hawks were allotted to degrees and orders of men according to rank and station—for instance, to royalty

the jerfalcon, to an earl the peregrine, to a yeoman the goshawk, to a priest the sparrow-hawk, and to a knave or servant the useless kestrel. The writings of Shakespeare furnish ample testimony to the high and universal estimation in which it was held in his days. About the middle of the seventeenth century falconry began to decline in England, to revive somewhat at the Restoration. It never, however, completely recovered its former favor, a variety of causes operating against it, such as enclosure of waste lands, agricultural improvements, and the introduction of fire-arms into the sporting field, till it fell, as a national sport, almost into oblivion. Yet it has never been even temporarily extinct, and it is still very successfully practiced at the present day.

FALERII, an ancient and powerful city of Etruria, the capital of the Falisci, who occupied the region between Soracte and Monte Cimino. The affinity of the Falisci with the Etrurians is both asserted and denied; in historic times Falerii at least appears as a city of Etrurian sympathies, and it probably belonged to the Etrurian League.

FALERNUS AGER, the name of a district in the northern part of Campania. The term has sometimes a wide and sometimes a restricted signification, being used with reference to the whole of the fertile plain between the Massican (now Mandragone) hills and the river Volturnus, but more commonly as denoting that portion of the plain lying at the foot of the Massican hills between the rivers Volturnus and Savo, and celebrated for its wines. In the time of Horace these were reputed to be the best of all Italy, but in the time of Pliny their reputation had begun to decline, and they were supplanted in general estimation by those produced in the adjoining Ager Statanus. Before it passed into the hands of the Romans, in 340 B.C., the whole district formed part of the Capuan territory. In 217 B.C. it was desolated by the Carthaginian General Maharbal.

FALIERO, MARINO, Doge of Venice, was born in 1274. In 1346 he commanded the Venetian forces at the siege of Zara, where, being attacked by Louis the Great of Hungary with a force of 80,000 men, he totally defeated them, inflicting a loss of 8,000, and compelling him to abandon all further attempts to raise the siege, which was concluded shortly afterward by the surrender of the defenders at discretion. As commander of the Venetian fleet he also gained several victories and captured Capo d'Istria. He was elected doge September 11, 1354. His reign was short, and it had both a disastrous commencement and a tragic close. Very soon after his election the Venetian fleet was captured by the Genoese, and hardly had he concluded a four months' truce with Genoa, when a very trivial incident occurred which resulted in his arrest and execution. It would appear that, though an able general and prudent statesman, Faliero possessed a temper so choleric that when he was provoked reason for a time almost forsook him. On the occasion of the usual court feast on Shrove Thursday, a young nobleman named Michele Steno, perhaps excited by wine, took some liberties with one of the maids of honor, and the doge on that account caused him to be ignominiously expelled from the hall. Provoked at such a public affront Steno went to the hall of audience and wrote on the doge's chair the following words: "Marino Faliero, the husband of the beautiful wife; others kiss her, he keeps her." The author of the insult was soon discovered and arrested, but the council sentencing him only to two months' imprisonment, the doge resolved to have adequate revenge, and with this view formed a conspiracy to seize all the nobles and leading citizens, and to make himself despot of Venice. The plot being, however, discovered a short



time before the day fixed on, the doge and principal conspirators were arrested, and were executed on April 17, 1355.

FALK, JOHANN DANIEL, a German author and philanthropist, was born at Dantzic, October 20, 1768. After attending for some time the gymnasium of his native town, he entered the University of Halle with the view of studying theology, but preferring, on second thoughts, a non-professional life, he gave up his theological studies and went to live at Weimar. There he published a volume of satires which procured him the notice and friendship of Wieland, and admission into the literary circles of the city. On the invasion of Germany by the French, Falk joined the army, and so distinguished himself at the battle of Jena that the Duke of Weimar created him a counselor of legation. In 1813 he succeeded in establishing a society for friends in necessity, and about the same time he founded an institute for the care and education of neglected and orphan children, which in 1829 was changed into a free public school. The first literary efforts of Falk took the form chiefly of satirical poetry, and gave promise of greater future excellence than was ever completely fulfilled, for as his later pieces were directed more against individuals than the general vices and defects of society, they gradually degenerated in quality. In 1804 he published a comedy entitled *Amphitryon*, which met with some success, and a tragedy entitled *Prometheus*. From 1797 to 1803 he published a kind of satirical almanac entitled *Taschenbuch für Freunde des Scherzes und der Satire*. In this publication he wrote a description of the hospitals of Berlin under the satirical title of *Denkwürdigkeiten der Berliner Charité auf das Jahr 1797*, which led to the appointment of a committee to inquire into their management, and finally to their reform. In 1806 Falk founded a critical journal under the title of *Elysium und Tartarus*. He also contributed largely to contemporary journals. He enjoyed the acquaintance and intimate friendship of Goethe, and his account of their intercourse was published after the death of both under the title *Goethe aus näherm persönlichen Umgange dargestellt*, Leipsic, 1832. Falk died February 14, 1826.

FALKE, JOHANN FRIEDRICH GOTTLIEB, a German historian, was born at Ratzeburg, April 20, 1823. In 1848 he went in the capacity of tutor to Munich, where he remained five years, and diligently availed himself of the use of the Government library for the purpose of prosecuting his historical studies. In 1855 he was appointed secretary of the German museum at Nuremberg, and in 1859 keeper of the manuscripts. With the aid of the manuscript collections in the museum he now turned his attention chiefly to political history, and, along with his brother Jacob, and Johann Müller, established an historical journal under the name of *Zeitschrift für deutsche Culturgeschichte* (4 vols., 1855-59). To this journal he contributed a history of German taxation and commerce. On the latter subject he published separately *Geschichte des deutschen Handels* (2 vols., Leipsic, 1859), and *Die Hanse als deutsche See- und Handelsmacht* (Berlin, 1826). In 1862 he was appointed secretary of the state archives at Dresden, and a little later keeper. He there began the study of Saxon history, still devoting his attention chiefly to the history of commerce and economy. He died at Dresden, March 1, 1876.

FALKIRK, a municipal and parliamentary burgh and market-town of Scotland, in the County of Stirling, twenty-five and one-half miles west by north from Edinburgh by rail, is situated on a declivity which overlooks the expanse of fertile country called the Carse of Falkirk. Population (with suburbs) 12,000.

FALKLAND, a royal burgh of Scotland, county of

Fife, is situated at the north foot of the East Lomond Hill, twenty-two miles north-northwest of Edinburgh.

FALKLAND, VISCOUNT. See CARY, LUCIUS.

FALKLAND ISLANDS, a group of islands in the South Atlantic, belonging to Britain, and lying about 250 miles east of the nearest point in the mainland of South America. The islands are about two hundred in number, but only two are of considerable size; the largest of these, East Falkland, is 95 miles in extreme length, with an average width of 40 miles, and the smaller, West Falkland, is 80 miles long, and about 25 miles wide. The area of East Falkland is about 3,000 square miles, and that of West Falkland 2,000. Most of the others are mere islets, the largest 16 miles long by 8 miles wide. The two principal islands are separated by Falkland Sound, a narrow strait from 18 to 2½ miles in width, running nearly due north and south (magnetic). The coast-line of both islands is deeply indented, and many of the bays and inlets form secure and well-protected harbors. East Falkland is almost bisected by two deep fiords, Choiseul and Brenton Sounds, which leave the northern and southern portions connected only by an isthmus a mile and a half wide. The northern portion is hilly, and is crossed by a rugged range, the Wickham Heights, running east and west, and rising in some places to the height of nearly 2,000 feet. The remainder of the island consists chiefly of low undulating ground, a mixture of pasture and morass, with many shallow freshwater tarns, and small streams running in all the valleys. The general appearance of the country is tame and uninteresting, not unlike one of the outer Hebrides. The general coloring is dark brownish-green, relieved along the strike of the hills by veins of white quartzite denuded by the wearing away of softer rocks on both sides, and left projecting on the mountain slopes like dilapidated stone dykes. Two fine inlets, Berkeley Sound and Port William, run far into the land at the northeastern extremity of the island. Port Louis, until lately the seat of government, is at the head of Berkeley Sound, but the anchorage there having been found rather too exposed, about the year 1844 a town was laid out, and the necessary public buildings were erected on Stanley Harbor, an admirably sheltered recess within Port William. Above Stanley Harbor the land slopes up for a hundred feet or so to a low ridge, beyond which what is called there the "camp" (*campo*) extends nearly level for many miles. The little town of Stanley is built along the shore of the harbor and stretches a short way up the slope; it has a population of 600 or 700 inhabitants.

The Falkland Islands were first seen by Davis in the year 1592, and Sir Richard Hawkins sailed along their north shore in 1594. In 1598, Sebald de Wert, a Dutchman, visited them, and called them the Sebald Islands, a name which they still bear on some of the Dutch maps. Captain Strong sailed through between the two principal islands in 1690, and called the passage Falkland Sound, and from this the group afterward took its English name. In 1763, the islands were taken possession of by the French, who established a colony at Port Louis, on Berkeley Sound; they were, however, expelled by the Spaniards in 1767 or 1768. In 1761 Commodore Byron took possession on the part of England, on the ground of prior discovery, and his doing so was nearly the cause of a war between England and Spain, both countries having armed fleets to contest the barren sovereignty. In 1771, however, Spain yielded the islands to Great Britain by convention. As they had not been actually colonized by England, the Republic of Buenos Ayres claimed the group in 1820, and formed a settlement at Port Louis, which promised



to be fairly successful, but, owing to some misunderstanding with the Americans, it was destroyed by the latter in 1831. After all these vicissitudes, the British flag was once more hoisted at Port Louis in 1833, and since that time, the Falkland Islands have been a regular British colony under a governor, and the seat of a colonial bishopric. The population of the Falkland Islands is, at present, about 1,250, by far the greater number being English and Scotch, with a few Buenos-Ayorean Gauchos.

The Falkland Islands form, essentially, a part of Patagonia, with which they are connected by an elevated submarine plateau, and their flora is much the same as that of Antarctic South America. The trees, which form dense forest and scrub, in southern Patagonia and in Fuegia, are absent, and one of the largest plants on the islands is a gigantic woolly ragweed, which attains, in some places, a height of three to four feet. A half-shrubby veronica (*V. decussata*) is found locally on the west island. The greater part of the "camp" is formed of peat, which, in some places, is of great age and depth, and at the bottom of the bed very dense and bituminous.

FALLMERAYER, JAKOB PHILIPP, a German traveler and historical investigator, best known for his opinions in regard to the ethnology of the modern Greeks, was born, the son of a poor peasant, at Tschötsch, near Brixen in Tyrol, December 10, 1791. During the Napoleonic wars the still youthful student forsook his books, joined the Bavarian infantry in 1813, took part in a battle near Hanau, and accompanied his regiment to France. Receiving his discharge in 1818, he was successively engaged as teacher and professor in the gymnasium at Ausburg, and in the pro-gymnasium and lyceum at Landshut. The three years from 1831 to 1834 he spent in travel, along with the Russian Count Ostermann Tolstoi, visiting Egypt, Palestine, Syria, Cyprus, Rhodes, Constantinople, Greece, and Naples. On his return he was elected in 1835 a member of the Royal Bavarian Academy of Sciences, but he soon after left the country again on account of political troubles, and spent the greater part of the next four years with Count Tolstoi at Geneva. Constantinople, Trapezunt, Athos, Macedonia, Thessaly, and Greece were visited by him during 1840-41; and after some years' residence in Munich he returned in 1847 to the East, and traveled through parts of Palestine, Syria, and Asia Minor. The political changes in Bavaria invited him home in 1848, and he was appointed professor of history in the Munich University, and made a member of the national congress at Frankfort-on-the-Maine. He there joined the left or opposition party, and in the following year he accompanied the rump-parliament to Stuttgart, a course of action which naturally led to his expulsion from his professorate. During the winter of 1849-50 he was obliged to live in Switzerland to escape arrest, but the amnesty of April, 1850, enabled him to return to Munich. He died April 26, 1861. His contributions to the history of Greece in the Middle Ages are of great value; and though his theory that the Greeks of the present day are almost pure Slavonians, with hardly a drop of true Greek blood in their veins, has not been accepted *in toto* by other investigators, it has served to modify the opinions of even his greatest opponents.

FALLOPIUS, or FALLOPIO, GABRIELLO (1523-1562), one of the greatest anatomists of his time, was a native of Modena. He studied medicine at Ferrara, and, after a European tour, became teacher of anatomy in that city. He thence removed to Pisa, and from Pisa, at the instance of Cosmo I., Grand-duke of Tuscany, to Padua, where, besides the chairs of anatomy

and surgery and of botany, he held the office of superintendent of the new botanical garden.

FALL RIVER, a city of Massachusetts, on the north-east arm of Narragansett bay, forty-six miles south of Boston. The Fall river, which here joins the Taunton, has a descent of 130 feet in less than half a mile. The harbor on Taunton river is safe and easy of access, and has depth of water sufficient for the largest ships. Fall River has a large coasting trade, and is engaged in the whale and other fisheries. The city contains several fine public buildings, valued at \$1,000,000, in addition to the forty-two public schools, which cost an equal sum. There are twenty-five Protestant and ten Catholic churches. The public library contains 36,000 volumes. The city is lighted by gas and electricity; its water-works cost \$1,861,438, and its sewer system \$972,563 up to January 1, 1890. There is a fire department of 139 men, for which \$54,500 is appropriated, and a police department costing \$96,000. The city receipts for the year ending December 31, 1889, were \$1,622,047, and the expenditures \$1,572,618. The assessed valuation for 1890 was \$49,841,691, and the city tax levy \$1.78 per \$100. The following are the official statistics of the manufactures of Fall River in 1890: Number of corporations, 40; capital stock (incorporated), \$20,643,000, (probably \$40,000,000 invested); number of mills, 65; number of spindles, 2,128,228; number of looms, 49,586; number of employees, 21,750; pay roll per week, \$145,405; weekly productions—pieces, 221,000; yards of cloth per annum, 597,850,000; bales of cotton per annum, 244,856; number of waterwheels, 12; number of steam engines, 108; total horse power (water wheels, 1,405 H. P.), 47,435; tons of coal used, 175,000. The census of 1890 returned the population at 74,398.

FALMOUTH, a municipal and parliamentary borough and market-town of England, County of Cornwall, on the south side of Falmouth Harbor, fifteen miles north-northeast of Lizard Point, and 267 miles west-southwest of London. Population, 6,000.

FALSE POINT, a land-locked harbor in the Cuttack district of Orissa, reported by the famine commissioners in 1867 to be the best harbor on the coast of India from the Húgí to Bombay. It derives its name from the circumstance that vessels proceeding up the Bay of Bengal frequently mistook it for Point Palmyras, a degree further north. The anchorage is safe, roomy, and completely land-locked.

FALSTER, an island in the Baltic, belonging to Denmark. It is richly wooded and well cultivated, and is very fertile, especially in fruits. See DENMARK.

FALUN, or FAHLUN, a town of Sweden, capital of a laen of the same name, which, however, is also called Dalarna or Dalecarlia, is situated in a bare and rocky country near the west shore of Lake Runn, seventy-three miles west of Gefle.

FAMAGOSTA, a ruined town of Cyprus.

FAMILY. Family is a word of which the etymology but partially illustrates the meaning. The Roman *familia*, derived from the Oscan *famel* (*servus*), originally signified the servile property, the thralls, of a master.

Leaving for a while the Roman terms, we may provisionally define "family," in the modern sense, as the small community formed by the union of one man with one woman, and by the increase of children born to them. These in modern times, and most European countries, constitute the household, and it has been almost universally supposed that little natural associations of this sort are the germ-cell of early society. Thus, Aristotle derives the first household from the combination of man's possession of property—in the slave or in



domesticated animals — with man's relation to woman. The village, again, with him is a colony or offshoot of the household, and monarchical government in states is derived from the monarchy of the eldest male member of the family. Now, though certain ancient terms, introduced by Aristotle in the chapters to which we refer, might have led him to imagine, as we shall see, a very different origin of society, his theory is, on the face of it, natural and plausible, and it has been almost universally accepted. The beginning of society, it has been said a thousand times, is a family, a natural association of kindred by blood, composed of father, mother, and their descendants. In this family, the father is absolute master of his wife, his children, and the goods of the little community; at his death, his eldest son succeeds him; and in course of time this association of kindred, by natural increase and by adoption, develops into the clan, *gens*.<sup>\*</sup> As generations multiply, the more distant relations split off into other clans, and these clans, which have not lost the sense of primitive kinship, unite once more into tribes.

**FAMINES.** War, pestilence, and famine are regarded by many as the natural enemies of the human race; but in truth these are all more or less associated with the circumstances of civilization. In the highest state of civilized society there ought to be no war; there need be no pestilence; and famine alone would stand as being beyond the range of human prevention. The advancement in the social scale to a state of dependence upon cereal crops, while the facilities of intercommunication between different countries, or even parts of the same country, remained imperfect, led almost necessarily to the periodical recurrence of scarcity. Cereal crops are especially dependent upon conditions of climate for their regular production; and here at least are circumstances beyond human control.

**FAN**, a light implement used for giving motion to the air. *Ventilabrum* and *flabellum* are names under which ecclesiastical fans are mentioned in old inventories. Fans for cooling the face have been in use in hot climates from remote ages. A bas-relief in the British Museum represents Sennacherib with female figures carrying feather fans. They were attributes of royalty along with horse-hair fly-flappers and umbrellas. Examples may be seen in plates of the Egyptian sculptures at Thebes, and other places, and also in the ruins of Persepolis. In the museum of Boulak, near Cairo, a wooden fan handle showing holes for feathers is still preserved. It is from the tomb of Amen-hotep, of the eighteenth dynasty, seventeenth century B.C. In India fans were also attributes of men in authority, and sometimes sacred emblems. A heart-shaped fan, with an ivory handle, of unknown age, and held in great veneration by the Hindus, was given to the Prince of Wales. Large punkahs or screens, moved by a servant who does nothing else, are in common use by Europeans in India to this day.

Fans were used in the early Middle Ages to keep flies from the sacred elements during the celebrations of the Christian mysteries. Sometimes they were round, with bells attached — of silver, or silver gilt.

Folding fans had their origin in Japan, and were exported thence to China. They were in the shape still used — a segment of a circle of paper pasted on a light radiating frame-work of bamboo, and variously decorated, some in colors, others of white paper on which verses or sentences are written.

Fans were used by Portuguese ladies in the fourteenth century, and were well known in England before the close of the reign of Richard II. In France the inventory of Charles V. at the end of the fourteenth century mentions a folding ivory fan. They were brought

into general use in that country by Catherine de' Medici, probably from Italy, then in advance of other countries in all matters of personal luxury. The court ladies of Henry VIII.'s reign in England were used to handling fans. Queen Elizabeth is painted with a round feather fan in her portrait at Gorhambury; and as many as twenty-seven are enumerated in her inventory (1606). Coryat, an English traveler, in 1608, describes them as common in Italy. They also became of general use from that time in Spain. In Italy, France, and Spain fans had special conventional uses, and various actions in handling them grew into a code of signals, by which ladies were supposed to convey hints or signals to admirers or to rivals in society.

**FANDANGO**, like the *Bolero*, is an old Spanish national dance, in  $\frac{3}{4}$  time. It is danced usually to the accompaniment of a guitar, while the dancers beat time with castanets, a custom borrowed from the Moors. It proceeds gradually from a slow and uniform to a lively motion; and notwithstanding the simplicity of the *pas*, vividly expresses all the gradations of the passion of love, in a manner sometimes bordering on licentiousness.

**FANEUIL HALL**, a public hall in Boston, Mass., erected in 1742 by Peter Faneuil, and presented by him to the town. In its original condition as so gifted, the building contained a hall for public meetings, with lesser apartments above, and a basement used as a market. During the revolutionary struggle with England, the hall was so often used for important political meetings that it became known as "the cradle of American liberty."

**FANO**, a city of Italy in the province of Urbino-e-Pasaro, is situated in a rich and fertile plain on the shores of the Adriatic, at the mouth of the Metauro, seven miles southeast of Pesaro. Population, 7,000.

**FANSHAWE**, SIR RICHARD, poet and statesman, was the youngest son and tenth child of Sir Henry Fanshawe, remembrancer of the exchequer under James I. He was born early in June, 1608, at Wareham Park, Hertfordshire. In 1644, being with the court at Oxford, he had the degree of D.C.L. conferred upon him, and the same year he was appointed secretary at war to the Prince of Wales, with whom he set out for the western counties, Scilly, and then Jersey. It was during this stormy period that Fanshawe first appeared as a poet; in 1647 he published his translation of the *Pastor Fido* of Guarini, the remaining copies of which he re-issued in 1648 with the addition of a number of other poems, original and translated. In 1648 his attention was again directed to public affairs by his appointment as treasurer to the navy under Prince Rupert, which he held till the latter was forced, in 1650, to escape to the West Indies. Fanshawe then proceeded to Paris, where he was created baronet, and sent to Madrid as envoy extraordinary. He was, however, immediately afterward sent to Scotland, but was captured on the way at the battle of Worcester in 1651. He was sent to London, and kept in such close confinement that his health broke down; but Cromwell, finding that he was really dangerously ill, allowed him to choose a place of residence, with the proviso that he was not to stir from it more than five miles. It was during his captivity that he published, in 1652, his *Selected Parts of Horace, Prince of Lyricks*, a very graceful work, in which he keeps as close as possible to the metrical form of the *Odes*. He chose to retire to Tankerly Park, in Yorkshire, the seat of Lord Strafford, and gave himself up entirely to literature. In 1654 he completed translations of two of the comedies of the Spanish poet Antonio de Mendoza, which were published after his death, in 1671, under the title of *Querere per solo querere: to Love only for Love's Sake*,



and *Fiestas de Aranjuez*. But the great labor of his retirement was the translation of the national epic of the Portuguese poet, Camoens.

In February, 1659, he broke through his bail, and joined Charles II. at Breda; he was enthusiastically received and loaded with promises. But when the Restoration was complete he did not, to his great disappointment, find himself made secretary of state. In 1661 he represented the university of Cambridge in parliament, and was presently sent out to Portugal as envoy extraordinary; he was shortly after appointed ambassador to the same court, and negotiated the marriage between Charles II. and the Infanta. At the end of the year he returned to England, only to be sent out as ambassador to Lisbon again in 1662. In 1663, he was recalled to be sworn one of his majesty's privy council. In the beginning of 1664 he was sent as ambassador to Philip IV. of Spain, and arrived at Cadiz in February of that year, to receive such an ovation as no English envoy had ever before enjoyed. During the whole of 1665 he was engaged in very delicate diplomatic relations between England, Portugal, and Spain; and in January, 1666, he traveled to Lisbon in the endeavor to bring about a peace between the last-mentioned powers. But he had scarcely returned to Madrid when he was somewhat peremptorily recalled to England. It is not known whether this affected his health, but at all events he fell ill at Madrid, and died there, after a short illness, on June 26, 1666.

FARADAY, MICHAEL, chemist, electrician, and philosopher, was born at Newington, Surrey, September 22, 1791, and died at Hampton Court, August 25, 1867. His parents had migrated from Yorkshire to London, where his father worked as a blacksmith. Faraday himself became apprenticed to Mr. Riebau, a bookbinder. The letters written to his friend Benjamin Abbott at this time give a lucid account of his aims in life, and of his methods of self-culture, when his mind was beginning to turn to the experimental study of nature. In 1812 Dr. Dance, a customer of his master, took him to hear four lectures by Sir Humphrey Davy. Faraday took notes of these lectures, and afterward wrote them out in fuller form. Under the encouragement of Mr. Dance, he wrote to Sir H. Davy, inclosing these notes. "The reply was immediate, kind, and favorable." He continued to work as a journeyman bookbinder till March 1, 1813, when, at the recommendation of Sir H. Davy, he was appointed assistant in the laboratory of the Royal Institution of Great Britain. He was appointed director of the laboratory February 7, 1825; and in 1833 he was appointed Fullerian professor of chemistry in the institution for life, without the obligation to deliver lectures. He thus remained in the institution for fifty-four years. He accompanied Sir H. Davy in a tour through France, Italy, Switzerland, Tyrol, Geneva, etc., from October 13, 1813, to April 23, 1815.

FARCE. See DRAMA.

FAREHAM, a market-town of England, county of Hants, situated at the northwestern extremity of Portsmouth harbor, seventy-three miles by road and eighty-four by the Southwestern Railway from London.

FAREL, GUILLAUME, a celebrated French Reformer, was born near Gap in Dauphiné in 1489. He was of noble descent, and it was the wish of his parents that he should adopt the military profession, but the pursuit of knowledge proved so attractive to him that he characteristically determined to have his own way, and succeeded in obtaining permission to enter the university of Paris. Here he became the intimate friend of Jacobus Faber (Stapulensis), from whom in all probability he imbibed his first doubts regarding many of the usages

and customs of the Roman Catholic Church. Through the introduction of Faber he was appointed professor to the college of Cardinal Lemoine, but not long afterward on the invitation of Bishop Briçonnet, he went to Meaux to assist Faber and others in preaching the doctrine of the Reformation. He was, however, compelled to leave France by the outbreak of the persecution of 1523, and went to Basel, where, in 1524, he defended the Reformation doctrines in a public disputation with great ability, but with such acrimonious keenness that Erasmus sided with the opponents of the Reformation in requiring his expulsion from the city. From Basel he went to Strasburg, and thence, on the invitation of the Duke of Würtemberg, to Montbéliard, where he preached for a time with great success; but since, as usual, he forgot to temper his zeal with discretion, he was compelled to leave the town in the spring of 1525. He shortly afterward began his Reformation crusade at Aigle in Switzerland, and notwithstanding the strenuous opposition of the monks, he, in 1528, obtained permission from the authorities to preach in any place within the canton of Bern. He also extended his itineracies to the cantons of Neufchâtel and Vaud, and although often seriously maltreated by the mobs whom he provoked by his violent invectives, continued his crusade in these districts with unabated zeal till 1531, when increasing manifestation of hostility rendered it imperative that he should seek another sphere for his labors. In that year, accordingly, he paid a short visit to the Waldenses, after which he went to Geneva, where he began to hold meetings of the Reformers in his private house. On this account he was summoned to appear before the bishop's vicar, and after being frequently insulted and threatened, during the progress of his trial, by the monks and canons, who drowned his defense by their clamor, he was rudely and violently pushed out of the court, and was commanded to leave the town within three hours. Escaping with great difficulty from the fury of his opponents, he went by sea to Orbe. In 1553, however, he returned to Geneva under the protection of the government of Bern, and so successful were his sermons and his public disputations that in August, 1535, the town renounced the authority of the pope, and the simple worship of the Reformation was instituted in the churches. About this time Calvin visited Geneva, and Farel—whose superabounding zeal seems to have exercised a kind of spell over the calmer spirit of the great theologian—prevailed on him to give up all thoughts of a life of quiet study, and to devote himself to the cause of the Reformation in Geneva. Leaving Geneva to the care of Calvin, Farel returned to his work of itinerant preaching, chiefly in Neufchâtel, where, although the violent hostility of the priests and women showed no signs of diminution, he attracted large audiences, and gained a considerable number of adherents. Farel continued his labors with unabated zeal and vigor till 1565. In that year he visited Metz, where he had an enthusiastic reception, and preached with all his old fire and eloquence; but after returning to the house where he was residing, he was overpowered by exhaustion, from which he never rallied, dying on September 13th.

FARGO, the capital of Cass county, N. Dak., is situated on the Red River of the North, opposite Moorhead, Minn. It has railway communication by the Northern Pacific and other roads with all parts, and is an important distributing center. Fargo has daily and weekly newspapers, national and other banks, a United States land office, churches, schools, factories, stores, and a population (1890) of 5,613.

FARIA Y SOUSA, MANOEL DE, a Spanish and Portuguese historian and poet, was born in 1590 of an



ancient Portuguese family, probably at Pombiero, attended for several years at the University of Braga, and when about fourteen entered the service of the bishop of Oporto. With the exception of about four years (1630-1634), during which he held the post of ambassador to the papal court, the greater part of his later life was spent at Madrid, and there he died, after long-continued sufferings, on June 3, 1649.

FARIBAULT, the county seat of Rice county, Minn., is situated on the Cannon river, fifty-three miles south of St. Paul, and on the Chicago, Milwaukee and St. Paul railroad. It has two national banks, six flouring mills, three newspaper offices, and manufactures of bricks, carriages, furniture and plows. Faribault possesses a handsome court-house, twelve churches, a convent, a public library, good schools, and a population (1890) of 6,524.

FARIDKOT, a feudatory state of Northwestern India, under the political superintendency of the government of the Punjab. Population, 73,000.

FARIDPUR, or FURREEDPORE, a district of British India, in the Dacca division of Bengal. It is bounded on the north and east by the Ganges or Padmá River, separating it from Pubna and Dacca districts; on the west by the Chandná and Madhumati Rivers, separating it from Jessor; and on the south by Bákarganj.

FARINA, or PORTO FARINA, a town of the regency of Tunis, at the mouth of the Madjerda (the ancient Bagradas), about fifteen miles east of Bizerta or Binzert.

FARINATO, PAOLO (1522-1606), a painter and architect, was a native of Verona. He is sometimes named Farinato degli Uberti, as he came from the ancient Florentine stock to which the Ghibelline leader Farinata degli Uberti, celebrated in Dante's *Commedia*, belonged. He flourished at the same time that the art of Verona obtained its greatest luster in the works of Paolo Cagliari (Paul Veronese).

FARINELLI, whose real name was CARLO BROSCHI, one of the most extraordinary singers that ever lived, was born January 24, 1705, at Naples (Burney), or, according to Sacchi, his biographer, at Andria. Having been prepared for the career of a sopranist, he soon acquired a voice, the beauty of which has never been surpassed, under the instruction of the celebrated Porpora. He became famous, while yet a boy, throughout Southern Italy, where he was usually called *el ragazzo*; and in 1722 he made his *début* in *Eomene*, written by his master, at Rome, where he created the greatest astonishment by vying with a celebrated German trumpet-player in holding and swelling a note of prodigious length and power. In 1724 he appeared at Vienna, and at Venice in the following year, and returned to Naples shortly afterward.

In Spain, where he had only meant to stay a few months, he ended by passing nearly twenty-five years. His voice, used by the queen to cure Philip V. of his melancholy madness, acquired for him, through the success of the treatment, an influence with that prince which gave him eventually the power, if not the name, of prime minister. This power he was wise and modest enough to use discreetly; and he always conciliated the enemies whom his favor raised up against him. He had, however, to pay for his position a price which to every artist must seem too heavy—that of singing night after night to the king the same six songs, and never anything else. Under Ferdinand VI. he held the same place, and was decorated with the cross of Calatrava. He utilized his ascendancy over this king by persuading him to establish an Italian opera. While at Madrid he heard of the death of Bernacchi, of whom he speaks in terms of affection and esteem in an extant letter addressed to the Padre Martini. Returning to Bologna, Farinelli

spent the remainder of his days there in a melancholy splendor, and died July 15, 1782, aged seventy-seven. His voice was of large compass, possessing seven or eight notes more than those of ordinary singers.

FARINI, LUIGI CARLO, an Italian physician, statesman, and historian, was born at Russi, in Ravenna, October 22, 1812. As a member of the Sardinian parliament, and as proprietor and editor of a political journal, *Il Piemonte*, Farini was one of the most influential supporters of the policy of Cavour, and in 1859 he was sent by the latter on a political mission to Parma and Modena. On the flight of the Duke of Modena in June, 1859, Farini was intrusted with the provisional government of the town, in which capacity he negotiated the annexation of the duchy to Piedmont. The same year saw the publication of the second volume of his *Storia*. In June, 1860, he was named by Cavour minister of the interior, but resigned the office on the death of Cavour in June of the following year. On December 8, 1862, he succeeded Ratazzi as president of the cabinet. He died in 1866.

FARMER, HUGH, an English theologian, was born in the neighborhood of Shrewsbury in 1714. About 1730 he entered the theological academy at Northampton, taught by Dr. Doddridge, and on completing his studies he was appointed to a charge at Walthamstow in Essex, officiating at the same time as chaplain to a wealthy gentleman in the neighborhood in whose house he lived. He soon, however, resigned his chaplaincy, and took up his residence in the house of another member of his congregation, where he continued to live until his removal to London in 1761, on his acceptance of an invitation to become the afternoon preacher at Salter's Hall. There he was soon afterward appointed one of the Tuesday lecturers. He died February 5, 1787.

FARMER, RICHARD, the Shakespearian commentator, was born at Leicester in 1735. He was educated first at the free grammar school of his native town, and afterward at Emmanuel College, Cambridge, of which in 1760 he became classical tutor, and in 1775 master, in succession to Dr. Richardson, the biographer of the English bishops. In the latter year also he was appointed vice-chancellor, and three years afterward chief librarian of the university. In 1780 he was appointed to a prebendal stall in Lichfield, and in about two years more to one at Canterbury; but the second office he exchanged in 1788 for that of canon residentiary of St. Paul's. He died 1797.

FARNABIE, or FARNABY, THOMAS, grammarian, classical commentator, and one of the most noted schoolmasters of his day, was a native of London, born in 1575. In politics he was a Royalist, and was imprisoned for his supposed participation in the Tunbridge rising of 1643. He died in June, 1647.

FARNESE, the name of a noble Italian house, to which belonged Pope Paul III., the celebrated Elizabeth, wife of Philip V. of Spain, and a long line of princes of Parma, including the great governor of the Netherlands. The first member of the family known in history was Ranuccio Farnese, a successful general of the Church, who held the papal fiefs of Farnese and Montalto in the thirteenth century. Several of his descendants also fought with distinction in the armies of the Holy See, and others allied themselves with Florence, Venice, Siena, and other states, among whom may be mentioned Pietro Farnese, who led the Florentines to victory over Pisa in the middle of the fourteenth century. The historical importance of the Farnesi dates, however, from the accession of Alessandro Farnese to the papal throne as Paul III. Through his unblushing



nepotism the dignity and domains of the family were greatly enlarged. For its aggrandisement the fiefs of Parma and Piacenza, Castro, and Camerino were alienated from the papacy; the marquisate of Novara was obtained from Charles V.; and marriages were arranged which allied it with the royal houses of Spain and France.

FARNESE, ALEXANDER, Prince of Parma, the famous governor of the Low Countries, was born most probably about 1546. He was the son of Ottavio Farnese, prince of Parma, and the celebrated Margaret of Austria, natural daughter of Charles V. His boyhood he spent at Alcalá and Madrid, having as companions his ill-fated cousin Don Carlos and his uncle Don John of Austria, who were both about the same age as himself. His chief delight was in martial exercises, and his passionate ambition was for warlike glory. At eleven years of age he earnestly begged leave to join the expedition which fought at St. Quentin, and wept bitterly when his request was refused. He had, indeed, a love for fighting for its own sake. During the wearisome inactivity of his residence at Brussels with his mother, whose abilities and masculine force of character had led to her appointment as governor of the Low Countries, it was his nightly amusement to saunter in disguise through the streets and challenge any cavalier of martial appearance whom he met. As a young man he was extremely unpopular among the Netherlanders; men said that he was nothing but a coxcomb and a bravo. He treated even the nobility with the most insolent arrogance. When he honored them with an invitation to dinner, he sat for the most part silent at the head of the table, and placed his guests below the salt. During his stay at Brussels, on November 18, 1565, his marriage with that wonderful paragon of propriety, Donna Maria of Portugal, was celebrated with great splendor and at prodigious expense.

At length, after years of impatient waiting, his passionate longing for military glory could no longer be repressed, and in 1571 he gained his first laurels by brilliant personal bravery in the battle of Lepanto. It was seven years before he had an opportunity of proving his splendid ability as a general. In the end of 1577 he was placed in command of the reinforcements sent to Don John, and it was mainly his prompt decision at a critical moment which secured the victory of Gemblours (1578). His abilities were now recognized by his master, Philip II., and on the death of Don John, he was appointed governor of the Netherlands.

He found the Netherlands distracted by petty jealousies and party quarrels, and to take advantage of these all his skill in diplomacy and in the art of delicate bribery was exerted to the utmost. In the magistracies of many of the towns he created a party favorable to the king, and the Walloon provinces were induced to return to their allegiance. But he was unable to prevent the Union of Utrecht, which was formed in 1579 by the genius of William the Silent. For five years he waged equal war with that great prince, his chief exploits being the taking of Maestricht and Oudenarde. In 1584 William was assassinated. The opportunity was not lost by Farnese. He offered most favorable terms (except as regarded the matter of religion), and gained over Ghent and several other important towns. But the great town of Antwerp remained faithful to the Union, and against it all his energies were now directed. The history of this siege may be taken as best displaying all the many and varied qualities of a great general which Alexander Farnese possessed. Antwerp enjoyed a natural means of defense, of which William of Orange had resolved to take advantage, and which would

have enabled it to bid defiance even to the genius of Farnese.

The only hope of Antwerp was to break down the dykes, and, taking advantage of Farnese's absence, Sainte Aldegonde collected for the work a strong and resolute force. A fierce hand-to-hand fight ensued on the slippery dykes, and the work was going slowly forward, while the Spaniards were beginning to give way, when Farnese himself appeared on the scene, and by his own exploits, and the inspiration of his presence, entirely changed the fortune of the day.

The year 1586 he employed in taking steps to obtain the command of the Meuse and Rhine. Grave, Gelders, and Deventer he gained by bribery and intrigue, and Neuss, by assault. In this year negotiations were opened with Elizabeth, who had sent an army under Leicester into the Low Countries. These negotiations are the most striking illustration of Parma's principles of diplomacy. So perfect was his apparent frankness that even Elizabeth and Burleigh, who were well accustomed to double-dealing, appear to have been completely deceived.

As time went on, Parma's position grew more and more difficult. His soldiers died in hundreds from cold, hunger, and disease; money was doled out to him with the most niggardly hand; and it required all his influence to keep down mutiny. He was constantly harassed by Philip's commands to attempt the impossible. He had prepared a fleet of transport boats, and the king issued repeated orders that he should with these invade England, though every port was blockaded by the ships of Holland and Zealand. Once, goaded to rashness, he made a mad attempt to break through the line, but the odds were too great, and he was repulsed with heavy loss. Even after the failure of the Armada, Philip still thought that Farnese with his unarmed boats should do that which the huge warships had failed to accomplish.

In 1590 the condition of the Spanish troops had become intolerable. Farnese could no longer support them from his private resources; his very jewels were pledged, and the supplies from the king did not increase in regularity or amount. A mutiny broke out, but was speedily suppressed. Under these difficulties, Farnese was commanded to leave the work of years, and raise the siege of Paris, which was surrounded by Henry of Navarre. He left the Netherlands on August 3, 1590, with 15,000 troops. At Meaux he swore publicly in the cathedral that he had come, not to conquer France, but only to assist the Catholic cause. By the most splendid strategy he outwitted Henry, and relieved Paris; but his troops being insufficiently supplied, he was compelled immediately to return to the Low Countries, losing on the march many stragglers and wounded, who were killed by the peasantry, and leaving all the positions he had taken to be recaptured by Henry.

Again, in 1591, in the very midst of a desperate contest with the genius of Prince Maurice, sorely against his will Farnese was obliged to give up the engrossing struggle and march to relieve Rouen. Henry at once cautiously raised the siege. In a subsequent engagement Farnese was wounded by a musket-ball in the arm. Yet he defied pain and fever, refused to take the necessary rest, and was carried in his couch to the field. At length Henry seemed to have shut up the Spanish army safely in the land of Caux, but Farnese found means to escape across the Seine. He spent a few days in Paris, and then visited Spa to drink the waters.

All his splendid services had not gained for him the confidence of Philip. His enemies persuaded the king that he was only striving to conquer the Netherlands that he might obtain the sovereignty for himself. Philip's first characteristic step was to dispatch a letter ex-



pressing complete confidence and tender affection; Farnese was then politely requested to return home to aid his majesty with his advice. But at the same time the Marquis of Cerralbo was sent to the Netherlands to share his work with the Mansfelds, and with orders to send him home by force, if he refused to obey the king's deceitful command. But all trouble was spared the grateful monarch. In the autumn of 1592, Alexander Farnese prepared to invade France for the third time. His robust constitution ruined by the prodigious labors he had performed, gouty, dropsical, fevered with his wounds he was lifted into his saddle every day till the very morning of his death. On December 3, 1592, in the town of Arras, he fainted while undressing for bed, and in a few hours was dead. He was only forty-six years of age.

**FARNESE, ELIZABETH**, Queen of Spain, born on October 25, 1692, was the only daughter of Odoardo II., Prince of Parma. At the age of twenty-one (1714) she was married by proxy at Parma to Philip V. of Spain. The marriage was arranged by the Italian cardinal Alberoni, with the concurrence, it is said, of the king's mistress, the Princess Orsino. On her arrival at the borders of Spain Elizabeth was met by the princess; but she received her rival sternly, and perhaps in accordance with a plan previously concerted with the king, at once ordered her to be removed from her presence and from Spain. Over the weak king Elizabeth quickly obtained complete influence. This influence was exerted altogether in support of the policy of her countryman Alberoni, one chief aim of which was to recover the ancient Italian possessions of Spain, and which actually resulted in the seizure of Sardinia and Sicily. So vigorously did she enter into this policy that, when the French forces advanced to the Pyrenees, she placed herself at the head of one division of the Spanish army. But Elizabeth's ambition was grievously disappointed. The Triple Alliance thwarted her plans, and at length, in 1720, the allies made the banishment of Alberoni a condition of peace. Sicily also had to be evacuated. And finally, all her entreaties failed to prevent the abdication of Philip, who in 1724 gave up the throne to his heir, and retired to the palace of La Granja. Seven months later, however, the death of the young king recalled him to the throne. In 1736 Elizabeth had the satisfaction of seeing her favorite scheme realized in the accession of her son Don Carlos (afterward Charles VI.), to the throne of the Two Sicilies and his recognition by the Powers in the Treaty of Vienna. Elizabeth survived her husband twenty years, dying in 1766.

**FARNHAM**, a market-town of England, county of Surrey, near the left bank of the Wey, ten miles west-southwest of Guildford, and forty miles from London by rail.

**FARO**, a city and seaport of Portugal, chief town of the province of Algarve, is situated on the Rio Feroso, near its mouth, twenty miles west by south of Tavira.

**FAROE ISLANDS**, or **FEROE ISLANDS** (Danish, *Färøerne*), a group in the North Sea belonging to Denmark. They are situated between Iceland and the Shetland Islands.

**FARQUHAR, GEORGE**, a dramatist of the last century, the successor in comedy of Wycherley and Congreve, was the son of a clergyman, and was born in Londonderry, Ireland, in the year 1678. In his sixteenth year he was sent to Trinity College, Dublin, under the patronage of the bishop of Dromore. While yet a minor he appeared as a dramatist. His comedy of *Love and a Bottle* was performed at Drury Lane in 1698, and its success far exceeded his expectations. His next comedy, *The Constant Couple* (1700), was still more favorably received. Wilks, a popular comedian and a

special friend of Farquhar's (they had been associates in Dublin), by his performance of the part of "Sir Harry Wildair," contributed very much to the success of the play. "He *made* the part," says Farquhar. In the following year the dramatist brought out a sequel to it, entitled *Sir Harry Wildair*. Wilks' acting was again attractive, but like all continuations (that of Don Quixote excepted) the second part was much inferior to the first.

In 1702, Farquhar published a trifling volume of *Miscellanies*—poems, letters, and a discourse on comedy. In 1703, Farquhar had another comedy on the stage—*The Inconstant, or the Way to Win Him*—the *hint* of which, he says, he took from Fletcher's *Wild Goose Chase*, but was charged with spoiling the original. The poetry of Fletcher certainly evaporates when its scenes are transmuted into the prose dialogue of Farquhar.

About this time the dramatist was betrayed into what was perhaps the greatest blunder of his life. A lady conceived a violent passion for him, and, though penniless like himself, contrived to circulate a report that she was possessed of a large fortune. Farquhar snapped at the gilded bait. He married the lady, and found too late that he had been deceived. It is related, however, that he had the magnanimity to pardon a deception which must have appeared a compliment to his genius, and in truth there was something to forgive on his own part for having been so readily entrapped contrary to all the rules of love and the drama. Increased exertion, however, was necessary, and in 1704 he produced *The Stage Coach*, a piece adapted from the French by Farquhar in conjunction with Anthony Motteux, a clever, reckless playwright and essayist, and remarkable as having, though a Frenchman, given the world the best English translation of Don Quixote. Three more comedies proceeded from Farquhar before his career was sadly closed at the age of thirty. *The Twin Rivals* was brought out in 1705, *The Recruiting Officer* in 1706, and *The Beaux Stratagem* in 1707. The last two are vastly superior to Farquhar's other plays, and are the works by which he is now remembered. To relieve the poor dramatist from his difficulties, increased by his ill-starred marriage, the Duke of Ormond is said to have advised him to sell his commission in the army and pay his debts, his grace promising at the same time to give him a captaincy in his own regiment. Farquhar sold his commission, but the duke either forgot or was unable to fulfill his promise. Farquhar's earliest biographer ascribes the unfortunate counsel to a "certain great courtier," who made solemn assurance which he forgot to keep. *The Beaux Stratagem* was written in six weeks, while death was impending over its author. Before he had finished the second act he knew that he was stricken with a mortal illness, but it was necessary to persevere and to be "consumedly lively" to the end. He had received in advance £30 for the copyright from Lintot the bookseller. The play was brought on the stage March 8th, and Farquhar lived to have his third night, and an extra benefit on April 29th, on which day he is said to have died.

**FARRAGUT, DAVID GLASCOE**, first admiral of the United States navy, was the son of Major George Farragut, a Catalan by descent, a Minorquin by birth, who had emigrated to America in 1776, and, after the peace, had married a lady of Scotch family and settled near Knoxville, in Tennessee; there Farragut was born on July 5, 1801. At the early age of nine he entered the navy, under the protection of his name-father, Captain David Porter, with whom he served in the *Essex* during her cruise in the Atlantic in 1812, and afterward



in the Pacific, until her capture by the *Phæbe*, in Valparaiso Bay, on March 28, 1814. He afterward served on board the *Washington*, 74, carrying the broad pennant of Commodore Chauncey in the Mediterranean, and pursued his professional and other studies under the instruction of the chaplain, Mr. Folsom, with whom he contracted a life-long friendship. Folsom was appointed from the *Washington* as United States consul at Tunis, and obtained leave for his pupil to pay him a lengthened visit, in the course of which he acquired a familiar knowledge of Arabic and Turkish. Farragut is said, in his later years, to have spoken fluently all the principal European languages; this is probably an exaggeration, but with an hereditary knowledge of Spanish, he may have picked up some French and Italian at this time; until the very end of his career, it was his only visit to European waters. In 1825 he was promoted to the rank of lieutenant, while serving in the navy yard at Norfolk, where he continued till 1832; he then served for a commission on the coast of Brazil, and was again appointed to the yard at Norfolk. It is needless to trace the ordinary routine of his service step by step. The officers of the United States navy have one great advantage which is wanting to the English; when on shore they are not necessarily parted from the service, but are employed in their several ranks in the different dockyards, escaping thus not only the private grievance and pecuniary difficulties of a very narrow half-pay, but also, what, from a public point of view, is much more important, the loss of professional aptitude, and of that skill which comes from unceasing practice. On September 8, 1841, Farragut was promoted to the rank of commander, and on September 14, 1855, to that of captain. At this time he was in charge of the navy yard, Mare Island, California, from which post he was recalled in 1858, and appointed to the *Brooklyn* frigate, the command of which he held for the next two years.

When the war of secession broke out in 1861, he was "waiting orders" at Norfolk. By birth and marriage he was a Southerner, and the citizens of Norfolk counted on his throwing in his lot with them; but professional pride, and affection for the flag under which he had served for more than fifty years, held him true to his allegiance; he passionately rejected the proposals of his fellow townsmen, and as it was more than hinted to him that his longer stay in Norfolk might be dangerous, he hastily quitted that place, and offered his services to the Government at Washington. These were at once accepted; he was requested to sit on the Naval Retiring Board—a board then specially constituted for clearing the navy of unfit or disloyal officers—and a few months later was appointed to the command of the "Western Gulf Blockading Squadron," with the rank of flag-officer, and ordered to proceed forthwith, in the *Hartford*, to the Gulf of Mexico, to collect such vessels as could be spared from the blockade, to proceed up the Mississippi, to reduce the defenses which guarded the approaches to New Orleans, and to take and hold the city. All this Farragut executed to the letter, with a skill and caution that won for him the love of his followers, and with a dash and boldness that won for him the admiration of the public, and the popular name of "Old Salamander." The passage of the Mississippi was forced on April 24, 1862, and New Orleans surrendered on the 26th; this was immediately followed by the operations against Vicksburg, from which, however, Farragut was compelled to withdraw, having learnt the old lesson that against heavy earth-works, crowning hills of sufficient height, a purely naval attack is unavailing; it was not till the following summer, and after a long siege, that Vicksburg surrendered to a land force

under General Grant. During this time the service on the Mississippi continued both difficult and irksome; nor until the river was cleared could Farragut seriously plan operations against Mobile, a port to which the fall of New Orleans had given increased importance. Even then he was long delayed by the want of monitors with which to oppose the ironclad vessels of the enemy. It was the end of July, 1864, before he was joined by these monitors; and on August 5th, undismayed by the loss of his leading ship, the monitor *Tecumseh*, sunk by a torpedo, he forced the passage into the bay, destroyed or captured the enemy's ships, including the ram *Tennessee*, bearing Admiral Buchanan's flag, and took possession of the forts.

The town was not occupied till the following April, but with the loss of its harbor it ceased to have any political or strategical importance. With this Farragut's active service came to an end; for though in September, 1864, he was offered the command of the force intended for the reduction of Wilmington, the state of his health, after the labors and anxieties of the past three years, in a trying climate, compelled him to decline it and to ask to be recalled. He accordingly returned to New York in December, and was received with the wildest display of popular enthusiasm. It was then that the Government instituted the rank of vice-admiral, previously unknown in the American service. Farragut was promoted to it, and in July, 1866, was further promoted to the rank of admiral. In 1867, with his flag flying in the *Franklin*, he visited Europe. The appointment was an honorable distinction without political or naval import; the *Franklin* was, to all intents, for the time being, a yacht at Farragut's disposal; and her arrival in the different ports was the signal for international courtesies, entertainments, and social gaiety. She returned to America in 1868, and Farragut retired into private life. Two years later, on August 14, 1870, he died at Portsmouth, New Hampshire.

FARRAKHÁBÁD (FURRUCKABAD), a district of British India, in the Agra division, and under the jurisdiction of the lieutenant-governor of the Northwestern Provinces.

FARRANT, RICHARD, composer of English church music, flourished during the sixteenth century. Very little is known about him. Fétis gives 1530 as the date of his birth, but on what authority does not appear.

FARS, or FARSISTAN, a province of Persia, extending along the Persian Gulf, and conterminous with Khusistan, Irak, and Kirman.

FASANO, a town of Italy, in the circondario and province of Bari, thirty-two miles south of Bari, and a little to the west of the railway to Brindisi.

FASTI, plural for the adjective *fastus*, but more commonly used as a substantive, is derived, according to Varro, from *fas*, meaning what is binding, or allowable, by divine law, as opposed to *jus*, or human law. *Fasti dies* thus came to mean the days on which law business might be transacted *sine piaculo*, thus corresponding to our own "lawful days." Originally the fasti were a kind of official year-book, or almanac, with dates and directions for religious ceremonies, court-days, market-days, divisions of the month, and the like. Fastus Pompeius calls them *totius anni descriptio*. In later times they meant state records in general. The fasti, again, were of two distinct kinds—*kalendaria*, or *fasti kalendares*, subdivided into *urbani* and *rustici*, and next, *fasti magistrates*, or *historici*. Until 314 B.C. the lore of the *kalendaria* remained the exclusive and lucrative monopoly of the priesthood; but in that year Cn. Flavius, a pontifical secretary, introduced the custom of publishing in the forum, tables containing the



requisite information, besides brief references to victories, triumphs, prodigies, etc. These tables were also called *fasti*.

FASTING (*jejunare*) is most accurately defined as a withholding of meat, drink, and all natural food from the body for a determined period. So it is defined by the Church of England, in the sixteenth homily, on the authority of the Council of Chalcedon, and of the primitive church generally. In a looser sense, the word is employed to denote abstinence from certain kinds of food merely; and this meaning, which, in ordinary usage, is probably the more prevalent, seems also to be, at least, tolerated by the Church of England when it speaks of "fast or abstinence days," as if fasting and abstinence were synonymous. More vaguely still, the word is occasionally used as an equivalent for moral self-restraint generally. This secondary and metaphorical sense occurs in one of the fragments of Empedocles.

For the physiological aspects of the subject the reader may consult the article DIETETICS.

The origin of the practice is very obscure. Mr. Herbert Spencer has collected, from the accounts we have of various savage tribes in widely separated parts of the globe, a considerable body of evidence tending to suggest that it may have arisen out of the custom of providing refreshments for the dead, either by actually feeding the corpse, or by leaving eatables and drinkables for its use. The offerings to the dead are often made in so lavish a manner as necessarily to involve the survivors in temporary starvation, and it is no uncommon thing for a man to ruin himself by a funeral feast. It is suggested that the fasting which was at first the natural and inevitable result of such sacrifice on behalf of the dead may eventually have become to be regarded as an indispensable concomitant of all sacrifice, and so have survived as a well-established usage long after the original cause had ceased to operate. It is not pretended that this explanation is sufficient to account satisfactorily for all the known cases of primitive fasting; indeed, its extreme precariousness at once becomes evident when it is remembered that, now at least, it is usual for religious fasts to precede rather than to follow sacrificial and funeral feasts, if observed at all in connection with these. Mr. Spencer himself admits that "probably the practice arises in more ways than one," and proceeds to supplement the theory already given by another—that adopted by Mr. E. B. Taylor—to the effect that it originated in the desire of the primitive man to bring on at will certain abnormal nervous conditions favorable to the seeing of those visions and the dreaming of those dreams which are supposed to give the soul direct access to the objective realities of the spiritual world.

Probably, if we leave out of sight the very numerous and obvious cases in which fasting, originally the natural reflex result of grief, fear, or other strong emotion, has come to be the usual conventional symbol of these, we shall find that the practice is generally resorted to, either as a means of somehow exalting the higher faculties at the expense of the lower, or as an act of homage to some object of worship. The axiom of the Amazulu that "the continually stuffed body cannot see secret things," meets even now with pretty general acceptance; and if the notion that it is precisely the food which the worshiper foregoes that makes the deity more vigorous to do battle for his human friend be confined only to a few scattered tribes of savages, the general proposition that "fasting is a work of reverence toward God," may be said to be an article of the Catholic faith.

Although fasting as a religious rite is to be met with almost everywhere, there are comparatively few religions, and those only of the more developed kind, which appoint definite public fasts, and make them binding at

fixed seasons upon all the faithful. Brahmanism, for example, does not appear to enforce any stated fast upon the laity. Among the ancient Egyptians fasting seems to have been associated with many religious festivals, notably with that of Isis, but it does not appear that, so far as the common people were concerned, the observance of these festivals (which were purely local) was compulsory. The third day of the Thesmophoria at Athens was observed only by the women attending the festival (who were permitted to eat cakes made of sesame and honey). It is doubtful whether the fast mentioned by Livy was intended to be general or sacerdotal merely.

The usage of the Christian Church during the earlier centuries was in this, as in so many other matters, influenced by traditional Jewish feelings, and by the force of old habit, quite as much as by any direct apostolic authority or supposed divine command. Habitual temperance was of course in all cases regarded as an absolute duty; and "the bridegroom" being absent, the present life was regarded as being in a sense one continual "fast." Fasting in the stricter sense was not unknown; but it is certain that it did not at first occupy nearly so prominent a place in Christian ritual as that to which it afterward attained. There are early traces of the customary observance of the Wednesday and Friday fasts—the *dies stationum*, and also of a "quadragesimal" fast before Easter. But the very passage which proves the early origin of "quadragesima," conclusively shows how uncertain it was in its character, and how unlike the Catholic "Lent."

*Later Practice of the Church.*—According to an expression preserved by Eusebius, Montanus was the first to give laws (to the church) on fasting. Such language, though rhetorical in form, is substantially correct. The treatise of Tertullian—*Concerning Fasting: against the Carnal*—written as it was under Montanistic influence, is doubly interesting, first, as showing how free the practice of the church down to that time had been, and then, as foreshadowing the burdensome legislation which was destined to succeed.

It is probable that the apparent severity of the mediæval Latin Church on this subject was largely due to the real strictness of the Greek Church, which, under the patriarch Photius in 864, had taken what was virtually a new departure in its fasting praxis. The rigor of the fasts of the modern Greek Church is well known; and it can on the whole be traced back to that comparatively early date.

At the council of Trent no more than a passing allusion was made to the subject of fasting. The faithful were simply enjoined to submit themselves to church authority on the subject; and the clergy were exhorted to urge their flocks to the observance of frequent jejunia, as conducive to the mortification of the flesh, and as assuredly securing the divine favor.

In the practice of modern Catholicism the following are recognized as fasting days, that is to say, days on which one meal only, and that not of flesh, may be taken in the course of twenty-four hours: The forty days of Lent (Sundays excepted), all the Ember days, the Wednesdays and Fridays in Advent, and the vigils of certain feasts, namely, those of Whitsuntide, of St. Peter and St. Paul, of the Assumption of the Blessed Virgin Mary, of All Saints, and of Christmas day. The following are simply days of abstinence, that is to say, days on which flesh at all events must not be eaten: The Sundays in Lent, the three Rogation days, the feast of St. Mark (unless it falls in Easter week), and all Fridays which are not days of fasting. In the English Church, the "days of fasting or abstinence" are the forty days of Lent, the Ember days, the Roga-



tion days, and all the Fridays in the year, except Christmas day. The evens or vigils before Christmas, the Purification of the Blessed Virgin Mary, the Annunciation of the Blessed Virgin Mary, Easter day, Ascension day, Pentecost, St. Matthias, the Nativity of St. John Baptist, St. Peter, St. James, St. Bartholomew, St. Matthew, St. Simon and St. Jude, St. Andrew, St. Thomas, and All Saints are also recognized at "fast days." In some of the New England States, it has been usual for the governor to appoint by proclamation at some time in spring a day of fasting, when religious services are conducted in the churches. National fasts have more than once been observed on special occasions both in England and in the United States of America.

On the subject of fasting, the views of Acrius are, to a large extent, shared by modern Protestant moralists. Rothe, for example, who on this point may be regarded as a representative thinker, rejects the idea that fasting is a thing meritorious in itself, and is very doubtful of its value even as an aid to devotional feeling. Of course when bodily health and other circumstances require it, it becomes a duty; and as a means of self-discipline it may be used with due regard to the claims of other duties, and to the fitness of things.

*Mahometan Fasts.*—Among the Mahometans, the month Ramadan, in which the first part of the Koran is said to have been received, is by command of the Prophet observed as a fast with extraordinary rigor. No food or drink of any kind is permitted to be taken from daybreak until the appearance of the stars at nightfall. Extending as it does over the whole "month of raging heat," such a fast manifestly involves considerable self-denial; and it is absolutely binding upon all the faithful, whether at home or abroad. Should its observance at the appointed time be interfered with by sickness or any other cause, the fast must be kept as soon afterward as possible, for a like number of days. It is the only one which Mahometanism enjoins; but the doctors of the law recommend a considerable number of voluntary fasts, as, for example, on the tenth day of the month Moharran.

FASTING, CLAUS, a Danish poet, was born at Bergen in Norway on October 29, 1746. In 1762 he came to reside in Copenhagen. Fasting edited a brilliant æsthetic journal, the *Kritiske Tilskuer*, or Critical Observer, and in 1772 he formed in Copenhagen the Norwegian Society, a sort of literary club, which included among its members all the best young talent of the time. Soon after this, however, he returned to his native town, and from 1778 to 1781 edited there a journal entitled *Provinzialblade*, or Provincial Pages, in which he published most of his poems. In 1783 he was made a member of the municipal council of Bergen, and there he died in 1791. His works were first edited in 1837, when they were issued in one volume, with a biographical study by Lyder Sagen.

FATES, in Latin mythology, a name given to certain beings who, by euphemism similar to that which gave to the Greek ERINYES the name of Eumenides, were also known as Parcæ, or the Merciful.

FATHERS OF THE CHURCH. Ecclesiastically the word "father" is used in a variety of secondary significations. In the Old Testament even, we find the name applied to priests and to prophets, as well as to kings; and in the days of later Judaism there was a definite office which was known as that of the Father of the Synagogue. In the Christian church almost every kind of spiritual relationship in which age or authority was in any way implied came to be expressed by some word denoting paternity.

The patristic period of the church's history is generally

held to begin with the close of the apostolic age; but historians are not agreed as to the date at which it may be said to have closed. Some Roman Catholic writers speak of Bernard, who died in 1153, as having been the "last of the fathers," while Greek patristic is often brought down so far as to the council of Florence. But it is usual to speak of the scholastic period as having begun with Anselm; and there seems to be no good reason for removing Bernard from the list of the schoolmen. As no very important author either in Latin or in Greek can be assigned to the centuries immediately preceding Anselm, it may therefore be said, roughly speaking, that the patristic period practically closed for the Eastern Church with Joannes Damascenus, and for the Western with Gregory the Great.

FATHIPUR, or FUTTEHPUR, a district of British India in the Allahâbâd division, under the jurisdiction of the lieutenant-governor of the Northwestern Provinces.

FATHIPUR SIKRI, a town in the Agra district in the Northwestern Provinces of India, on the road from Agra to Jaipur.

FATIMAH (606-632), the daughter of Mahomet by his wife Khadijah, and one of the four women whom the prophet regarded as perfect, was born at Mecca in 606.

FATTORE, IL. See PENNI.

FAUCHER, LEON, a French statesman and political economist, was of Jewish extraction, and was born at Limoges, September 8, 1803. In 1833 and 1834 he was editor of the *Constitutionnel*, after which he joined the staff of the *Courier*, and in 1839 became its editor. In politics he belonged to the party known as the dynastic left, and he was frequently consulted by the Thiers ministry of 1840. In 1842, the *Courier* changed hands, and on its new proprietors wishing slightly to modify its principles, Faucher resigned the editorship, and from that time devoted his attention almost exclusively to questions of political economy. In 1843, he visited England with the view of studying the social aspects of that country, and in October of the same year he began a series of articles in the *Revue des Deux Mondes*, recording the impressions made by his visit. Shortly after this he became one of the editors of the *Journal des Economists*, to the pages of which he contributed several valuable papers, more especially on the tariff of customs. He also took a prominent part in the organization of the French association on the model of the free-trade league of England, but on account of the extreme opinions of the majority of its members he soon resigned his connection with it. In 1846, chiefly on account of his advocacy of free-trade doctrines, he was elected member of the chamber of deputies for Rheims, and in the chamber he took a leading part in the discussion of all economical and financial questions. After the revolution of 1848, he became a member of the new assembly for the department of Marne, and in December of the same year he was named minister of public works, and a little later minister of the interior; but he was compelled through the opposition manifested to his measures by the extreme republicans to resign his office May 14, 1849. On April 10, 1851, he again accepted the same office from Louis Napoleon, then president of the republic, but when Napoleon resolved to appeal to universal suffrage Faucher again resigned; and after the *coup d'état* he also refused to become a member of the constitutional commission instituted by the emperor. The occurrence of an affection of the throat which gradually assumed an alarming form induced him to pass the summer of 1854 in different parts of the Pyrenees. He had resolved to remain in Italy over the winter, but in November business affairs called him to Paris, and on



his way back to Italy he was seized at Marseilles by typhoid fever, and died December 14th.

FAUCHET, CLAUDE, French historian and antiquary, was born at Paris in 1530. Of his early life few particulars are known. He applied himself to the study of the early French chroniclers, and proposed to publish extracts which would throw light on the first periods of the monarchy. During the civil wars he lost a large part of his books and manuscripts in a riot, and was compelled to leave Paris. He then settled at Marseilles. Attaching himself afterward to Cardinal de Tournon, he accompanied him in 1554 to Italy, whence he was several times sent on embassies to the king, with reports on the siege of Siena. His principal works treat of Gaulish and French antiquities, of the dignities and magistrates of France, of the origin of the French language and poetry, of the liberties of the Gallican church, etc. A collected edition was published in 1610. Fauchet took part in a translation of the *Annals of Tacitus*, which appeared in 1582. He died at Paris about the close of 1601.

FAUCHET, CLAUDE, the Abbé Fauchet, a French constitutional bishop, and a noted actor in the revolution, was born at Dornes, in the department of Nièvre, September 22, 1774. He devoted himself to the service of the church, passed through the usual course of studies, and was rapidly promoted. Before he was thirty years of age he made his mark as an orator in a panegyric of St. Louis, delivered before the French Academy. For some time he was engaged as tutor to the children of the Marquis of Choiseul, a brother of the famous minister of Louis XVI.; and he was afterward nominated grand-vicar of the Archbishop of Bourges, preacher to the king, and abbé of Montfort-Lacarre in Brittany. The influence of the new philosophy was clearly seen in his discourses, and the political tone of his sermon, *Discours sur les mœurs rurales*, at the festival of La Rosiere at Surènes, especially exposed him to censure. As he was proof against remonstrance, he was deprived of his office as preacher to the king. This occurred in 1788; and when in the following year the Revolution broke out, Abbé Fauchet was ready to fight with the foremost in the great cause. His speeches fired the primary assemblies and the sections of Paris, and on the memorable July 14th he was one of those who led the people to the attack on the Bastille, displaying, it is said, not only courage under fire, but skill worthy of an accomplished officer. He was elected a member of the Commune of Paris, figured in the clubs, blessed the tri-color flag for the National Guard, and by all means helped forward with a passionate zeal the revolutionary movement.

He contributed to the reorganization of the church by his *Discours sur la religion nationale*; and in May, 1791, he was appointed constitutional bishop of Calvados. During the same period he had delivered three discourses on liberty, a discourse on the harmony of religion and liberty, the funeral oration of the Abbé de l'Épée, and an *Eloge civique* of Franklin. The last of these was spoken in the rotunda of the corn-market in the course of the festivities of the federation in July, 1790. In these pieces the swift progress of the Revolution was reflected in a growing intensity of sympathy and enthusiasm on the part of the orator; and hostility to the church carried him well nigh to a denial of the faith of which he was a minister. In the winter of 1790-91 Fauchet organized, in the precincts of the Palais Royal, his "Cercle Social," with regenerative intent, to be carried out chiefly by means of fluent oratory. He presided in the meetings under the self-assumed title of "Procureur général de la Vérité." Condorcet was one of his coadjutors, and "ten thousand persons of respectability"

flocked to hear them—a noisy and phantasmal affair, which came to a speedy end. In 1791 Fauchet was elected deputy to the legislative assembly, and afterward to the convention. He wrote in favor of an agrarian law, voted against payment of priests who refused the oath to the constitution, and was one of the first to submit to the decrees for suppression of ecclesiastical costume. The excesses of the Jacobins, however, alarmed him, and he began to incline toward the Girondists. On the trial of the king he spoke earnestly and courageously against the proposal to put him to death, and voted for the appeal to the people, imprisonment, and banishment. The execution of the king drove him still nearer to the party of the Girondists, and thus made him an object of the wrath of the Mountain. His name was one of those included in the proscription list, but he continued to act as secretary of the assembly till May 31, 1793, when the decree of accusation against the Girondists was passed. On July 18th, he was accused, not only as a Girondist, but also, and without ground, as an accomplice of Charlotte Corday, the murderer of Marat. He was sent to the Conciergerie, was condemned with the Girondist deputies by the revolutionary tribunal on October 30th, and with them executed on the 31st.

FAUJAS DE SAINT-FOND, BARTHÉLEMI, French geologist and traveler, was born at Montélimart, May 17, 1741. He was educated at the Jesuits' College at Lyons; and, showing in his boyhood much poetic sensibility and a propensity to versifying, he received from some of his worldly-wise elders the earnest warning: If you would succeed, don't make verses. He appears to have submitted to this counsel; for he went to Grenoble and applied himself to the study of law, and was admitted advocate to the parliament. He rose to be president of the seneschal's court (1765), a post which he honorably filled, but the duties of which became before long intolerably irksome, for his feeling for nature was not extinguished, and his favorite relaxation was found in visits to the Alps. His final bent, however, was not to the poetic but to the scientific interpretation of nature. In his frequent Alpine rambles he was amassing observations and facts, the full value of which could only be known at a later time. Geology was in its infancy, had scarcely even a name, when Faujas began his studies of the forms, structure, composition, and superposition of rocks, nor was it possible for him to divine how vast the science that was to arise upon the foundation of the facts of which he was so keen and so diligent an observer. In 1776 he put himself in communication with Buffon, who was not slow to perceive that the humble labors of Faujas would be of great service to him in his larger and more imaginative sphere of work. Invited by Buffon to Paris, he quitted the law, and was appointed by Louis XVI. assistant naturalist to the museum, to which office was added some years later (1785, 1788) that of royal commissioner for mines. In 1775 he had discovered in the Velay a rich mine of pozzuolana, which he opened, and which was largely worked by the Government. One of the most important of his works was the *Recherches sur les volcans éteints du Vivarais et du Velay*, which appeared in 1778. Faujas died at his estate of Saint-Fond in Dauphiné, July 18, 1819.

FAUN. In Latin mythology, the name denoted a class of rural deities who fostered the productive powers of the earth and of animals, and had their dwelling in woods and groves, where they sported with the nymphs. In the later traditions of the people, Faunus was said to have succeeded Picus and Saturnus as king of the Laurentes; but these names may, like many others in the mythology of Italy, be referred to processes or



phenomena in the natural world, Saturnus or Seviternus being the god of the seed time and the harvest, and Picus the deity who cleaves the trees of the forest with the stroke of the lightning or the fury of the storm.

FAURIEL, CHARLES CLAUDE, a distinguished French historian, philologist, and critic, was born at St. Etienne, October 21, 1772. From 1795 to 1799 he devoted himself to strenuous study, more especially of the literature and history, both ancient and modern, of Greece and Italy. Having paid a visit to Paris in 1799, he was introduced to Fouché, minister of police, who immediately conceived for him a strong liking, and induced him to become his private secretary. The duties of this office Fauriel discharged both to the satisfaction of Fouché and with such courtesy and kindness as to secure many lasting friendships; but he must have found it scarcely congenial; and, as he continued to unite with the labor it entailed upon him the same continuous application to study as formerly, he found it necessary, in 1801, to recruit his health by foreign travel. In resigning his office in the following year, he was therefore actuated doubtless as much by these considerations as by the ostensible excuse that he had scruples in serving longer under Napoleon, when the latter, in violation of strict Republican principles, became consul for life.

After the revolution of 1830 the Government was persuaded by his friends to establish expressly for Fauriel a chair of foreign literature. In 1836 he was elected a member of the Academy of Inscriptions and Belles Lettres, and in the same year he published in four volumes *L'Histoire de la Gaule méridionale sous la domination des conquérants Germains*—the second portion of a work which, when completed, was to have consisted of three parts, the first on southern Gaul under the Roman dominion, and the third and most important embracing the period from the dismemberment of the empire of Charlemagne to the end of the thirteenth century, and including the brilliant though premature spring-time of early literature and culture which for a short period relieved the sterile winter that had so long overshadowed the intellect of Europe. In 1837 Fauriel published, along with an introduction, a translation of the Provençal poem on the war of the Albigenses, and in 1839 he became a member of the commission of the *Histoire littéraire de la France*, to which work he contributed a number of articles on the writers of the thirteenth century. He died July 15, 1844. After his death appeared in 1846 *Histoire de la littérature provençale*, which formed his course of professional lectures for 1831-2, and may be regarded as a portion of the third part of the great work which he had sketched out on the history of Southern Gaul.

FAUST, or FUST, printer. See FUST.

FAUSTINA, ANNIA, wife of Marcus Aurelius, was the daughter of Antoninus Pius and the Empress Annia Galeria Faustina Augusta. Her husband, whose original name was Marcus Annianus Verus, was the son of her maternal uncle Annianus Verus; and both, through their grandfather Annianus Verus, consul for the third time in 126 A.D., traced their descent from Numa Pompilius.

FAUSTUS. Although probably the name of an actual historical personage, Faustus or Faust is principally interesting as an ideal figure of a twofold and in some respects antithetical type—on the one hand the deliberate choice of evil, on the other an unsatisfied aspiration toward the highest good. The development of the latter conception from the former—of Goethe's Faust from the mediæval Faustus—is an interesting study in itself, and affords a curious example of the accretions and modifications incidental to popular myths. The Faustus of tradition arose from the fusion of

two more primitive conceptions—that of a compact with the evil one, of which the Theophilus of ecclesiastical legend supplies the typical example, and that of the subjugation of the infernal powers by intellectual preëminence, as in the cases of Virgil, Pope Sylvester, and Michael Scott. Early in the sixteenth century the two currents of tradition united in the person of an adventurer calling himself Faustus the Younger, from which it may be inferred that the name had already become typical. The existence of an elder Faustus cannot, however, be proved; nor can he, as sometimes suggested, be identified with Gutenberg's coadjutor, the printer Fust. A conjuring book bearing his name (*Dr. Faust's Dreifacher Höllenzwang*) exists in several MSS. dated early in the sixteenth century, and has been published in the magical collections of Scheibler and Horst. It nevertheless appears from the style to be at least a century later. The younger Faust's own existence has been disputed, but apparently on no good grounds. He is mentioned as a contemporary by Trithemius (1507), Mutianus Rufus (1513), Begardi (1539), and Gast (1548). Trithemius denounces him as a charlatan, who purposely shunned him for fear of exposure. Rufus and Gast claim to have been actually in his company. The former entertained the same opinion of him as Trithemius; the latter considers that a learned dog and horse which accompanied him were probably devils. The same judicious author vouches for his having been carried away by the demon in or about the year 1525. This catastrophe is also mentioned in an inscription on a picture still extant in Auerbach's cellar at Leipsic, bearing that date, and depicting the feats familiar to Goethe's readers. Further particulars are given by Wier in his well known work *De præstigiis demonum*, and in Manlius' *Locorum communium collectanea* (1562), in a passage often erroneously attributed to Melanchthon, whose conversation Manlius is not reporting on this occasion. According to him, Faustus was born at Knittlingen in Würtemberg (the popular legend says Rohda in Saxony, and other places are also mentioned), and educated at the university of Cracow. However unworthy of such a distinction, he had evidently by this time become a popular hero, around whom the floating accumulations of legend respecting such national wizards as the Bohemian Zyto, the English Friars Bacon and Rush, and the Polish Twardowski were gradually tending to group themselves. These ultimately took shape in the standard version of Faustus' life, published at Frankfort by Johannes Spiess in 1589. This remarkable book, the work of an anonymous scholar acquainted with Latin, first mentions Mephistophiles as the name of Faustus' familiar spirit, introduces new elements suggested by the compiler's animosity to Rome, and gives especial prominence to the traditions which represent Faustus in connection with classical mythology. The effect is to exalt his importance as a type by exhibiting him as in some sort a representative of free thought and free learning, thus paving the way for Goethe's more profound interpretation of his alleged compact with the fiend. The more obvious tragic aspects of the situation were magnificently brought out by Marlowe, whose tragedy of *Faustus*, founded on an English translation of the German narrative, is thought to have appeared as early as 1589. A more homely moral was drawn by Faustus' next biographer, Johann Wiedemann, who (1599) re-wrote the narrative from an edifying point of view, interspersing copious historical parallels and theological disquisitions—which latter, indeed, are not wanting in the earlier version—and omitting what he deemed unsuitable for pious ears. His pedantic labors, subsequently revised in the same spirit by Pfitzer (1664),



unfortunately led to the almost total disappearance of the older narrative, except in the abridged form of a chap book, in which it has survived nearly to our own times, and has even been reprinted in America. Another development of the myth was now at hand—the dramatic. It formed the theme of *Justi Placidii infelix prudentia*, a play in Latin verse published at Leipsic in 1598. By 1618, as appears from Ayrrer's *Opus Theatricum*, a play on the subject was a stock piece on the boards of the German puppet-theater. Heine thinks that it was introduced by the English itinerant players who traversed Germany at the time—a supposition confirmed by Lessing's previous indication of an English element in the text. These marionette pieces long maintained themselves as a popular entertainment. Zedler mentions them as still frequently performed in 1735; Heine saw the story of Faustus thus represented as late as 1826. It was not committed to writing, and was partly extemporized for the occasion. Restorations have nevertheless been given by Scheible (1447), Hamm (1850), and Engel (1872). Such representations undoubtedly served to keep the legend alive until it met with critics and poets able to discern its significance in the persons of Lessing and Goethe. The original draft of the latter's *Faust*, as pointed out by Heine, is almost entirely based upon the puppet representation. Lessing's interest in *Faust* is believed to have been awakened by a performance of the old play at Berlin in 1753. An anonymous *Faust* appeared in 1775 at Munich, and has recently been republished as Lessing's, which it certainly is not.

FAVART, CHARLES SIMON, French dramatist was born at Paris, November 13, 1710. His first success in literature was a poem entitled *La France délivrée par la Pucelle d'Orléans*, which obtained the prize of the Académie des Jeux Floraux. After the production of his first vaudeville, *Les Deux Jumelles*, circumstances enabled him to relinquish his business and devote himself entirely to the drama. He provided many pieces anonymously for the lesser theaters, and first put his name to *La Chercheuse d'Esprit*, which was produced in 1741. Among his most successful works were *Annette et Lublin*, *Le Coq du Village* (1743), *Ninette à la Cour* (1755), *Les Trois Sultanes* (1791), and *L'Anglais à Bordeaux* (1763). Favart became director of the Opéra Comique; and, in 1745, he married Mademoiselle Duronceray, a beautiful young singer and actress who had made a successful début the year before. By their united talents and labors the Opéra Comique rose to such a height of success that the jealousy of rival theaters was roused, and through their influence the house was suppressed the same year. Favart thus left without resources accepted the proposal of Marshal Saxe, and undertook the direction of a troupe of comedians, which was to accompany his army into Flanders. After the marshal's death in 1750, Favart returned to Paris, and resumed his pursuits as a dramatist. It was at this time that the Abbé de Voisenon became intimately associated with him and took part in his labors, though to what extent is uncertain. Madame Favart, after a long and painful illness, died at Paris, April 22, 1772. She is remembered as a bold reformer of stage costumes, breaking with the custom of dressing all *dramatis personæ* in court or showstyle, and introducing the use of costumes appropriate to the various characters. She had remarkable powers of mimicry, especially of the speech and accent of foreigners. She assisted her husband in some of his best productions. He felt her loss deeply, survived her twenty years, becoming nearly blind in his last days, and died at Paris, May 12, 1792.

FAVERSHAM, or FEVERSHAM, a municipal bor-

ough and market-town of England, county of Kent, is situated ten miles west-northwest of Canterbury, and forty-seven east-southeast of London by rail. The town consists of four principal streets forming an irregular cross, in the center of which are the town hall and market-place. The parish church is a spacious cruciform structure, surmounted by a tower and spire; both its exterior and interior have lately undergone restorations. Faversham has a free grammar school, a national school, a theatre, and assembly rooms. Faversham creek, which communicates with East Swale, is navigable up to the town for vessels of 150 tons. The shipping trade is pretty extensive, chiefly in coal, timber, and agricultural produce. The oyster fisheries are the principal industry, but brewing, brick-making, and the manufacture of Roman cement are carried on, and there are several large powder mills in the vicinity of the town. Population (1890), 8,000.

FAVORINUS, a celebrated sophist, flourished during the reign of Hadrian. A Gaul by birth, he was a native of Arles, but at an early age began his life-long travels through Greece, Italy and the East. He may have acquired some knowledge of Latin and Greek even before he left Gaul, for Arles was within a short distance of the Phocian colony of Marseilles—that "Athens of the West," which Varro calls "trilinguis," and which, according to Strabo, had taught the Gauls to become Philhellenes. His extensive knowledge, combined with great oratorical powers, raised him to eminence both in Athens and Rome.

FAWKES, FRANCIS (1721–1777), a poet and translator, was a native of Yorkshire. He published *Bramham Park, a Poem*, in 1745; a volume of poems and translations in 1761; and *Partridge Shooting, a Poem*, in 1767. His translations of the minor Greek poets—Anacreon, Sappho, Bion and Moschus, Musæus, Theocritus, and Apollonius—acquired for him considerable fame, but it may be safely predicted that when they are forgotten Fawkes will be remembered for his fine song, *Dear Tom, this brown jug, that now foams with mild ale*. He also edited a Family Bible with notes. He died August 26, 1777.

FAWKES, GUY, the most notorious of the Gunpowder Plot conspirators, was born at York, of a gentle family, in the year 1570.

The Catholics in England had hoped much from the accession of James I. To facilitate his passage to the throne, he had given great cause for such hopes, promising that the fines against recusants should not be exacted, and bestowing honors upon several Roman Catholic gentlemen. Therefore, when, after James was securely seated on the throne, the severe laws of Elizabeth against priests and recusants were again put into execution, many Roman Catholic gentlemen experienced feelings of deep resentment. Robert Catesby, a man steeped in plots, conspiracies, and secret embassies, but a gentleman of great personal power and fascination, conceived a plan for the remedy of all this. His parents had suffered much for their religion, and he himself had been an incessant plotter among the discontented Catholics of the later years of Elizabeth's reign, and for joining in Essex's rebellion had been heavily fined. But there is no reason to believe that he, or indeed any of the conspirators, were actuated by selfish motives or feelings of revenge in assenting to that scheme for the carrying out of which they dared and suffered so much. Catesby's own words probably express best the way in which they regarded the matter. "The nature of the disease," he said, "requires so sharp a remedy." It should also be remembered that the plot was conceived and entered upon before the more severe execution of the laws against recusants. Catesby's plan was to blow



up king, lords, and commons in the Parliament House with gunpowder. Early in 1604 he wrote to his cousin, Thomas Winter, desiring him to come to London. Winter, after some hesitation, having consented, found Catesby at Lambeth with John Wright. All three were old plotters and companions in plots and conspiracies. Catesby now broached his new scheme to Winter, who at first wondered at the strangeness of the conception and doubted of success, but finally gave his consent to it or to anything that Catesby should decide to enter upon. Wishing, however, to leave no quiet way untried to obtain their end, it was decided that Winter should go over to Flanders to meet Velasco, the constable of Castile, who was coming to England to negotiate the peace with Spain. Winter was to inform the constable of the state of the Catholics in England, and to entreat him to solicit the king that the penal laws against them might be recalled. Catesby named Fawkes as a likely man in case this quiet way failed. Winter saw the constable at Bergen, and giving up the hope that much would be done by his means, sought out Fawkes, whom he found with Stanley at Ostend. Representing to him that something was to be done in England, they passed together from Gravelines to Greenwich, April 22, 1604, and at once went to Catesby. At a meeting soon after they were joined by Thomas Percy, another zealous Romanist, a relative of the Earl of Northumberland, and one of the king's pensioners. The plot was propounded and approved of; all took a solemn oath of secrecy and perseverance, and afterward received the sacrament from Gerard, a Jesuit, who was in another room. In May a house adjoining the Parliament House was hired in Percy's name, from the cellars of which the conspirators proposed to work a mine. Having, however, with great labor worked about half-way through the nine feet of stone which composed the wall, they discovered that a vault, immediately under the House of Lords, was to let, and, as this exactly suited their purpose, it was at once engaged by Fawkes, who, being little known in England, passed as Percy's servant, and took the name of Johnson. Barrels of gunpowder which had been stored in a house at Lambeth were brought over in the night, large stones and bars of iron were placed upon them, and the whole covered with billets of wood, so that no suspicion might be excited in case it was found necessary to admit a stranger. All was prepared about May, 1605. The plan of the plot was that after the blow had been given, as most probably the Prince of Wales would attend and perish with the king, the duke (Charles) was to be seized and carried into the country, if possible; or otherwise possession was to be obtained of the person of the Princess Elizabeth, who was then at Combe Abbey in Warwickshire, and a rising was to be prepared among the Catholics of the midland counties. Fawkes was to fire the train, and then to get over as quickly as possible into Flanders in a ship prepared for his passage. After being several times prorogued, parliament was to meet on November 5th.

During the progress of the preparations many other gentlemen, Robert Winter, Christopher Wright, Keyes, Rookwood, Sir Everard Digby, and Francis Tresham, had been sworn in by Catesby to assist with labor or money. In the interval between the completion of the preparations and the opening of parliament, Fawkes was sent into Flanders to acquaint Stanley and Owen the Jesuit, with the plot, and to secure their coöperation after the event of the explosion. A great cause of disagreement among the conspirators was the fact that the Catholic lords and members of parliament would be destroyed in a common catastrophe with those whom the plot was specially intended to strike. That the

Catholics should somehow be warned there was general agreement, but not as to the method in which the warning should be given. This disagreement no doubt caused the failure of the whole transaction. Ten days before the opening of parliament, Lord Monteagle, a Catholic, and a friend of several of the conspirators, received an anonymous letter, giving him a warning, couched in ambiguous terms, not to attend the opening, for "they shall receyve a terrible blowe this parleament." It is not known who wrote the letter. Tresham was, and is, generally suspected; but when Catesby accused him of it, he vehemently and with oaths denied all knowledge of the matter. Something in the character of the letter and of the attendant circumstances seems to render it probable that the whole thing was prepared beforehand to quash the plot, but in such a manner that the Government should not be fully alive to the danger until the conspirators had had time to escape. It has also been suggested that the whole plot itself was got up by Cecil, and was nothing but a state trick. However, Monteagle at once took this letter to Salisbury, who communicated it to the king, directly his majesty returned from Royston, where he had been hunting, and it seems to have been at once decided that every precaution should be taken. Winter received warning that all was discovered. Tresham also warned Catesby and the others that all was known, and passionately desired them to make good their escape to foreign lands. They, however, determined to await further events, and Fawkes especially stuck to his post in the vault with that coolness of courage which seems to have been one of his chief characteristics.

The Lord Chamberlain, on November 4th, going over the Parliament House to see that all was prepared for the morrow, visited the vault, and there saw this "very tall and desperatè fellow," who, together with the large quantity of fuel, exciting suspicions which he communicated to the king, it was decided that a more strict search should be made. Sir Thomas Knevet, a Westminster magistrate, was ordered to direct this search, and going down to the house suddenly, just before midnight, he came upon Fawkes just stepping out of the door. The thirty-six barrels of powder were discovered; Fawkes was seized, bound with his own garters, and searched. Upon him were found a watch, a tinder box, and some touchwood. He at once avowed his purpose, and said that if he had been within the house when taken he would have blown up house, takers, himself, and all. He was taken to Whitehall and examined before the king. Answering all questions with careless, sarcastic indifference, he would say nothing to implicate his confederates. The other conspirators fled into the country to Dunchurch, where a meeting of the Catholic gentry had been convened under pretense of a hunting party. In the hue and cry which followed, all were either killed or taken. Fawkes and the others were repeatedly examined, and torture was, no doubt, in his case used to break the wonderful will and nerve of the man. On January 27, 1606, the trial took place. All were condemned to be drawn, hanged, and quartered. On Thursday the 30th, Digby R. Winter, Grant, and Bates (Catesby's servant) suffered in St. Paul's churchyard; the next day, T. Winter, Rookwood, Keys, and Fawkes, at Westminster. So all yet alive who, from belief in the cause or from love of Catesby, had joined his outrageous plot ascended the scaffold, Fawkes last; "his body being weak with torture and sickness, he was scarce able to go up the ladder." He "made no long speech, but after a sort, seeming sorry for his offense, asked a kind of forgiveness of the king and the state for his bloody intent," and so died.

FAXARDO. See SAAVEDRA.



FAY, ANDRAS, Hungarian poet and author, born May 30, 1786, at Kohány, in the county of Zemplin, was educated for the legal profession at the Protestant college of Sárospatak. Being, however, subsequently obliged to abandon the law as a vocation, on account of ill health, he devoted himself to literary pursuits, and became one of the best writers of Hungarian narrative prose. In the year 1835 Fáy was elected representative for the county of Pesth, in the Hungarian diet, where he became for a time the leader of the opposition party; and, though afterward eclipsed by Kossuth, he still continued to distinguish himself both by his liberal sentiments and by his unremitting efforts for the material internal progress of the nation. It is to him that the Pesth Savings Bank owes its origin, and he was one of the chief founders of the Hungarian National Theatre. He died on July 26, 1864.

FAYAL. See AZORES.

FAYETTEVILLE, capital of Cumberland county, N. C., is situated on Cape Fear river, 100 miles northwest of Wilmington. Population (1890), 4,220.

FAYOUM, a province of Egypt.

FEA, CAROL (1753-1834), an Italian archæologist. As a member of the Archæological Society of Rome, Fea gave considerable aid to the antiquarian researches carried on under its auspices.

FEARNE, CHARLES, an eminent writer on law, son of Charles Fearn, judge-advocate of the admiralty, was born in London in 1749. He died in 1794, leaving his widow and family in necessitous circumstances.

FEATHERS, modified outgrowths of integument, characteristic of birds, and belonging to the same series of skin-structures as the scales of fishes and reptiles, and the hairs of mammals. Even Aristotle suggested the parallelism of fish-scales and bird-feathers, and modern knowledge of the development has proved the fundamental similarity or homology of all the three types of integumentary outgrowth. Feathers must have been very early acquisitions of birds, since the most ancient form we know of—Archæopteryx, from Jurassic strata—already possessed them.

An ordinary feather exhibits two principal parts—axis and barbs. The axis is divided into a bare, hollow, inferior portion—the quill and the barb-bearing, solid, upper part—the shaft. At its base the quill is partly imbedded in a small sac of the skin, and shows at the very end a small aperture for the entrance of the nutritive vascular pulp. The barbs or small plates, which together form the vane, are linked together by pointed lateral barbules, which may be again interlocked by minute hooklets. Each barb with its barbules is thus itself like a little feather. In the ostrich family the barbs, though possessing barbules, are free, and the familiar loose plume results. In a great many birds the quill bears a second shaft, rising at the base of the vane. This is usually small, but in the cassowaries and a few other birds main shaft and “aftershaft” are almost equal, and the feather is thus distinctly double.

Only in a few birds—*e. g.*, the ostrich tribe and the penguins—do the feathers occur all over the surface; usually they are restricted to the “feather-tracts” between which the skin is bare or at most downy. Each feather is imbedded in a sac, readily obvious on a plucked bird, and with this sac are associated muscle fibers, more or less abundant, serving to erect the feather. Unlike hairs, feathers have no sebaceous glands associated with them; they are, however, anointed by the secretion of the “preen gland” on the tail.

The most conspicuous feathers clothing a bird are such as have been above described—‘contour feathers,’ or *pennæ*. Among these, however, there are down-feathers or plumes, in which the barbs remain soft and

free from one another. These are the first feathers, for a time abundant on young birds, but gradually for the most part ousted and replaced by the ordinary forms. Besides these are still simpler and smaller feathers with a long shaft and a rudimentary brush of barbs—the “filoplumes.” In addition to these common forms there are numerous peculiar modifications of restricted occurrence.

When in process of formation, feathers are of course genuinely alive; the vascular nutrient core of dermis keeps up the supply. They grow with great rapidity, and in some birds attain a length of more than two feet. When fully formed, however, the pulp dries and shrivels, and the feathers become virtually dead from tip to base. They usually last only one year, being replaced by a fresh growth, which generally occurs at the end of the productive period. This process of molting is in a general way equivalent to the “skin-casting” of reptiles, and the shedding of hair in mammals, but its physiology is not yet understood. Involving no little expenditure of vital energy, generally occurring after the already severe strain of reproduction, brooding, and parental care, molting is frequently associated with mortality, but when successfully accomplished is obviously of great advantage in repairing the injuries of the past and in equipping the birds afresh for migratory flight or the ordinary business of life.

Feathers excel hairs and scales in the richness and variety of their coloring. This is usually most prominent in the male birds, but is emphasized in many cases only when sexual maturity is attained. Very often the bright coloring is acquired along with other decorations in a spring molt before the breeding period. The color is due to the presence of pigment, but is greatly enhanced by physical peculiarities, such as markings on the barbs and the occurrence of air-spaces.

In regard to the general physiology of feathers but little can be said. Their utility as a clothing for the skin and as organs of flight is evident enough, but the conditions determining the historic and individual development of these most highly-evolved skin-structures are quite obscure. It is noteworthy, however, that this climax of integumentary outgrowth occurs in animals living a very active life, with the highest body temperature, and with peculiarly thin skin almost devoid of the usual glands.

Feathers are still largely used as quills for writing, for holding the sable hairs of artists’ brushes, and for toothpicks. Much more important is their use for stuffing beds, quilts, and cushions, when dried and cleaned; the feathers and down of the eider duck being most highly esteemed, and after them those of geese, swans, and poultry. The feathers of most kinds of birds are used for personal ornament, often after being washed, bleached, dyed, curled, or made up. Ostrich feathers are the most notable for ornamental purposes, and it is for its feathers alone that it is reared.

FEBRUARY, the second month of the year. In ordinary years it contains twenty-eight days, but in bissextile or leap year, by the addition of the intercalary day, it consists of twenty-nine days. This month was not in the Roman calendar. In the reign of Numa two months were added to the year, namely, January at the beginning, and February at the end; and this arrangement was continued until 452 B.C., when the decemvirs placed February after January.

FECAMP, a seaport town of France, department of Seine-Inférieure, is situated on the English Channel, at the mouth of the small river Fécamp, twenty-three miles north-northeast of Havre. Population, 14,000.

FECKENHAM, or FECKNAM, JOHN DE, the last abbot of Westminster, was born of poor parents in



Feckenham Forest in Worcestershire. He was successively chaplain to Bell, Bishop of Worcester, and to Bonner, Bishop of London. When the latter was deprived of his see (1549), Feckenham was committed to the Tower. He was released at the accession of Queen Mary, and became her chaplain. In rapid succession he was appointed chaplain to Bishop Bonner, and prebendary and dean of St. Paul's. Queen Elizabeth, on her accession (1558), sent for the abbot, and offered him, it is said, the archbishopric of Canterbury, but he could not conform to the new faith. He sat in her first parliament, and was the last mitred abbot that was seen in parliament. His influence there was steadfastly directed against all movements of reformation. In 1560 he was sent to the Tower, and, with intervals of freedom, remained in confinement more or less strict for the rest of his life. He died in Wisbeach Castle, in the Isle of Ely, in 1585.

FEDCHENKO, ALEXIS PAULOWITCH, a Russian naturalist and traveler, well known for his explorations in Central Asia. He was born at Irkutsk, in Siberia, on February 7, 1844; and, after attending the gymnasium of his native town, proceeded to the University of Moscow, for the study, more especially, of zoölogy and geology. In 1868 he traveled through Turkestan, the district of the lower Sir-Darya, and Samarcand; and shortly after his return he set out for Khokand, where he visited a large portion of territory till then unknown. Soon after his return to Europe he perished on Mont Blanc, while engaged in an exploring tour in Switzerland, September 15, 1873.

FEDERAL GOVERNMENT. A federal union of sovereign states for mutual aid, and the promotion of interests common to all, is a procedure so consistent with self-interest that examples of it can be adduced from very early times. Had a federal union of Hellenic states been effected at the close of the Persian war, results would have been achieved which were vainly aimed at subsequently—as by Athens herself, after the capture of Olynthus by Philip of Macedon. The effort to effect a union of states for the common good then failed; but at length, in the century following the death of Alexander, the Ætolian and Achæan confederacies were formed, and a spirit of unity was inspired which, if less tardily manifested, might have long perpetuated Hellenic freedom. For the first time a federative spirit contended effectively with the isolation which had so long animated the policy of the ancient work. Of the unions which followed, the two most celebrated were the Ætolian league and the confederacy of Achæans. The constitution of the Ætolian league, though democratic, included an aristocratic or privileged class. It was a league of districts rather than of cities, with chiefs of the hill tribes and leading citizens attending the annual assemblies at Thermus, and might not inaptly be compared to the Swiss confederacy of city and forest cantons. The Spartans alone compared with the Ætolians in their prolonged maintenance of the power of independent action and self-government.

Among the later European confederations the Swiss republic attracts most attention. As now constituted it consists of twenty-two sovereign states or cantons. The government is vested in two legislative chambers, a senate or a council of state, and a national council, constituting unitedly the federal assembly. The executive council of seven members elects the president and vice-president for a term of one year. Before the French Revolution the German empire was a complex confederation, with the states divided into electoral colleges, consisting—(1) of the ecclesiastical electors and of the secular electors, including the King of Bohemia; (2) of the spiritual and temporal princes of the empire

next in rank to the electors; and (3) of the free imperial cities. The emperor was elected by the first college alone. This imposing confederation came to an end by the conquests of Napoleon; and the Confederation of the Rhine was established, in 1806, with the French emperor as protector. But its principles were violated by its so-called protector, and in 1815 the Germanic confederation was established by the Congress of Vienna, which in its turn has been displaced by the present German empire.

The United States of America more nearly resembles the Swiss confederacy, though retaining marks of its English origin. The original thirteen States were colonies wholly independent of each other. By the Articles of Confederation and Perpetual Union between the United States of America, drawn up by Congress in 1777, the States bound themselves in a league of common defense; a common citizenship was recognized for the whole union; but each State reserved its sovereignty along with each power not expressly delegated to Congress, and the jealousy in regard to State's rights has never been entirely laid aside. The theory of the confederacy is that of a federal republic formed by the voluntary union of sovereign States. The powers of the central government are determined by the constitution of 1789, and are intrusted to three distinct authorities—executive, legislative, and judicial. The president, elected for a term of four years by electors chosen for that purpose by each State, is the representative head of the republic. The vice-president, *ex-officio* president of the Senate, assumes the presidency in case of resignation or death. Legislative power is vested in the Senate, composed of two members elected by each State for a term of six years; and in the Congress, consisting of representatives in numbers proportionate to the population of each State, holding their seats for two years. The supreme judicial authority, which forms the final court of appeal on all constitutional as well as legal questions, consists of a chief justice and eight judges, appointed for life by the president, subject to confirmation by the Senate.

The extension of responsible constitutional government by Great Britain to her chief colonies, under a governor or viceregal representative of the crown, has been followed in British North America by the union of the Canadian, maritime, and Pacific provinces under a federal government—with a senate, the members of which are nominated by the crown, and house of commons elected by the different provinces according to their relative population. The governor-general is appointed by the crown for a term of seven years, and represents the sovereign in all matters of federal government. The lieutenant-governors of the provinces are nominated by him; and all local legislation is carried on by the provincial parliaments.

FEDERICI, CAMILLO (1749–1802), Italian dramatist and actor, was born at Garessio, a small town in Piedmont, April 9, 1749. His real name was Giovanni Battista Viassolo, and that by which he is now known and which he transmitted to his children was taken from the title of one of his first pieces, *Camillo e Federico*. He was educated at Turin, and showed at an early age a great fondness for literature and especially for the theater. Fortune did not smile upon him; but he found a helpful friend in a wealthy merchant of Padua, Francis Barisan, for whose private theater he wrote many pieces. He was attacked in 1791 with a dangerous malady which disabled him for several years; and he had the misfortune to see his works, in the absence of any copyright law, published by others without his permission. At length, in 1802, he undertook to prepare a collected edition; but of this four volumes only



were completed when he was again attacked with illness, and died at Padua (December 23d). The publication of his works was completed in fourteen volumes in 1816. Another edition in twenty-six volumes was published at Florence in 1826–27. A biographical memoir of Federici by Neymar appeared at Venice in 1838.

FEE (*feodum*), in English law, signifies an estate of inheritance (*i.e.*, an estate descendable to the heirs of the grantee so long as there are any in existence), as opposed to an estate for life.

FEHMIC COURTS (FEHMGERICHTE or VEHMGERICHTE), celebrated secret tribunals, which flourished in Germany from the end of the twelfth century to the middle of the sixteenth century, and which, from the extent of their organization, and the mystery which surrounded their proceedings, inspired a feeling of dread in all who came within their jurisdiction. Their origin is uncertain. The traditional account is, that they were instituted by Charlemagne and Pope Leo III., to prevent the Saxons from relapsing into paganism. It is more probable that they arose from the relics of the ancient Teutonic free courts. Their immediate cause, however, is to be found in the utter lawlessness and disregard of authority then prevailing in Germany, which obliged the weak and the peace-loving to band themselves together, as protection against the outrages of the princes and nobles. The birthplace of the Fehmic Courts was Westphalia, where they appeared shortly after the deposition of Henry the Lion, in 1179. The duchy was, in consequence of this event, annexed to the archbishopric of Cologne, and the archbishops appear to have had a good deal to do with the origination of the courts. Fehmic Courts subsequently made their way into most other parts of Germany, but the institution never seems to have succeeded in gaining a firm footing outside the limits of Westphalia, or the Red Land, as it was called. Within this district, however, which included nearly the entire country between the Rhine and the Weser, they soon acquired an immense power, which was at first used only in a beneficial and upright manner, supplying a means of redress at a time when the public administration of justice was in abeyance. But in the end, as might have been anticipated, the secrecy of their proceedings, and the arbitrary nature of their rules, converted them into an instrument of tyranny in the hands of the very persons whose lawless deeds they were designed to suppress. The emperors themselves, who had at first encouraged the Fehmic Courts, finding them a useful means of keeping their feudal dependants in check, were unable directly to resist their encroachments; and it was only with the restoration of public order, and the establishment of a regular judicature, that the influence of the Fehmgerichte gradually waned. The last regular court is said to have been held at Celle, in Hanover, in 1568; but there are traces of the institution at a much later date; and in the present century even, a relic of the once famous Fehmgerichte was to be found in Westphalia, in the form of a society for the suppression of vice. It was abolished, by order of Jerome Bonaparte, in 1811.

FEITAMA, SYBRAND, a Dutch author, was born at Amsterdam, December 10, 1694. He was originally intended for the ministry, but eventually adopted a commercial career. In middle life, having made a sufficient fortune, he retired from business, and dedicated his remaining years to literature, and to a circle of friends that included all the most eminent of his younger contemporaries. In 1733 he published his translation of *Télémaque*, to which he had given twenty years of revision. In 1735 appeared two volumes of his *Stage Poems*, original dramas for reading rather than acting. In 1743 was issued the first draft of his translation of

the *Henriade*, in perfecting which he spent nearly a quarter of a century. Three volumes of his *Posthumous Poems* appeared in 1764. He died at Amsterdam on June 3, 1758.

FEITH, RHIJNVIS, a Dutch poet, was of aristocratic extraction, and was born at Zwolle, the capital of the province Overijssel, on February 7, 1753. It has been said with truth that his whole life was a model of social, personal, and literary good fortune; there has never lived a poet who enjoyed more unbroken prosperity. This is the more noticeable, because of all the important writers of Holland he is the one whose works are most full of melancholy and despair. He was educated at the universities of Harderwijk and Leyden, and took his degree at the latter in 1770. In 1772 he settled at his birthplace, and married. In 1780, in his twenty-seventh year, he became burgomaster of Zwolle, a post which he held for the remainder of his life. He built a luxurious villa, which he named Boschwijk, in the outskirts of the town, and here he lived in the greatest comfort. His first important production was *Julia*, in 1783, a novel written in emulation of *Werther*, and positively steeped in *Weltschmerz* and despair. This was followed in 1784 by the tragedy of *Thirsa*, the first of his dramatic poems. The next year was one of great mark in Feith's career: he published *Ferdinand and Constantia*, another *Werther* novel, and *The Patriots*, a tragedy. Both were very successful, and his poems were publicly crowned at Leyden. He was now the most popular poet in Holland, and this fact, combined with his burning patriotism, drew upon him the hatred of Bilderdijk. In 1793 and in 1795 he produced his tragedies of *Ines de Castro* and *Mucius Cordus*, the first taken from an episode in the *Lusiad*, the second composed in honor of the Batavian republic. From 1796 to 1814 appeared five volumes of *Odes and Miscellaneous Poems*. In 1802 he published another didactic poem, *Old Age*, in six cantos, and in 1804 *Poems for Public Worship*. He died on February 6, 1824.

FEJER, GYORGY, one of the most indefatigable Hungarian authors of the last generation, was born April 23, 1766, at Keszthely, in the county of Zala. From 1802 to 1804 he taught dogmatic theology at Stuhlweissenburg, where he for many years officiated as priest; and in 1808 he obtained a theological professorship at Pesth university. Ten years later (1818) he became chief director of the educational circle of Raab, and in 1824 was appointed librarian to the university of Pesth. Fejér was the most prolific of Hungarian authors—his works, which are nearly all written either in Latin or Hungarian, exceeding 180 in number. They treat of numerous subjects, and are of various sizes, from mere pamphlets to several volumes. His most important work, *Codex diplomaticus Hungariæ ecclesiasticus ac civilis*, published from 1829 to 1844, in eleven so-called tomes, really exceeds forty volumes. It consists of old documents and charters from 104 A.D. to the end of 1439, and forms an extraordinary monument of patient industry. This work and many others relating to Hungarian national history have placed Fejér in the foremost rank of Hungarian historians. He died July 2, 1851.

FELDKIRCH, the chief town of the Vorarlberg district of Tyrol in Austria, is situated at the junction of the valley of the Ill with the valley of the Rhine, about six and one-half miles above the confluence of the two rivers.

FELEGYHÁZÁ, chief town of the former district of Little Cumania, in Hungary, about sixty-six miles southeast of Pesth.

FELIBIEN, ANDRÉ (1619–1695), *Sieur des Avaux et de Javeroy*, French architect and historiographer.



Colbert, the great minister, recognized his abilities; and he was one of the first members (1663) of the Academy of Inscriptions. Three years later Colbert procured him the appointment of historiographer to the king. In 1671 he was named secretary to the newly founded Academy of Architecture, and in 1673 keeper of the cabinet of antiques in the palace of Brion. To these offices was afterward added by Louvois that of deputy controller-general of roads and bridges. Félibien found time in the midst of his official duties for study and research, and produced many literary works.

FELIBIEN, DOM MICHEL, French historian, was a son of André, and was born at Chartres, September 14, 1666. He died at St. Germain des Près, September 25, 1719. His *History of Paris*, which was far advanced, was completed by Lobineau assisted by De Varigny, former secretary to Félibien, and was published in 1725.

FELIX, the name of several popes, of whom the most noteworthy are the following:

FELIX I., a Roman by birth, succeeded Dionysius in 269. On account, it is said, of his having strongly supported the Christians during the persecutions under Aurelius, he was enrolled a martyr. He died in 274.

FELIX II. (?), pope or antipope, was in 356 raised from the archdeaconate of Rome to the papal chair, when Tiberius was banished by the Emperor Constantius for refusing to subscribe the sentence of condemnation against Athanasius. His election was contrary to the wishes both of the clergy and of the people, and the consecration ceremony was performed by certain prelates belonging to the court. In 357 Constantius, at the urgent request of an influential deputation of Roman ladies, agreed to the release of Tiberius on condition that he signed the semi-Arian creed. Constantius also issued an edict to the effect that the two bishops should rule conjointly, but Tiberius, on his entrance into Rome in the following year, was received by all classes with so much enthusiasm that Felix found it necessary to retire at once from Rome.

FELIX III. (or II.) was descended from one of the most influential families of Rome, and succeeded Simplicius in the papal chair March 2, 483. His first act was to repudiate the Henoticon, a deed of union, originating, it is supposed, with Acacius, patriarch of Constantinople, and published by the Emperor Zeno with the view of allaying the strife between the Monophysites and their opponents in the Eastern church. He also addressed a letter of remonstrance to Acacius; but the latter proved refractory, and sentence of deposition was passed against him. As Acacius, however, had the support of the emperor, a schism (the first on record) arose between the Eastern and Western churches, which lasted for thirty-four years. Felix died in 492.

FELIX IV. (or III.), a native of Beneventum, was, on the death of John in 526, raised to the papal chair by the Emperor Theodoric in opposition to the wishes of the clergy and people. His election was followed by serious riots, which were only quieted by the explanation of Theodoric that he had merely interposed his authority on account of the strifes of the ecclesiastical factions, and by his promise that in future the election should be vested in the clergy and people, although the confirmation of the emperor should also be required to render it valid. Felix after an uneventful pontificate of four years, died in September, 530.

FELIX V. (or IV.). See AMADEUS VIII.

FELIX, of Valois (1127-1212), one of the founders of the monastic order of Trinitarians or Redemptionists, was born in the district of Valois, France, April 19, 1127. Not long after he reached manhood he became a hermit in the forest of Galeresse, where he remained

till his sixty-first year, when his disciple Jean de Matha suggested to him the idea of establishing an order of monks who should devote their lives to the redemption of Christian captives from the Mahometans. With this view they arrived at Rome about the end of 1197, and obtained the sanction of the Pope for the establishment of the new order. On their return to France they founded the monastery of Cerfroi in Picardy, Felix remaining to govern and propagate the order, while Jean de Matha superintended the foreign journeys. A subordinate establishment was also founded by Felix in Paris near a chapel dedicated to St. Mathurin, on which account his monks were also called St. Mathurins. Felix died at Cerfroi, November 4, 1212, and was canonized.

FELIX, ANTONIUS, a Roman procurator of Judæa, Samaria, Galilee, and Peræa, entered upon his office in the eleventh or twelfth year of the Emperor Claudius. Both he and his brother Pallas were originally slaves, and, it is said, owed their freedom to Antonio, wife of the emperor, on which account it is probable that Felix received the surname Antonius. By some writers he is also called Claudius. Felix was cruel and licentious, and his accessibility to bribes led to a great increase of crime in Judæa under his government. The apostle Paul, after being apprehended in Jerusalem, was sent to be judged before Felix at Cæsarea, and so reasoned before him of righteousness, temperance, and judgment to come that Felix trembled. He nevertheless retained Paul in custody for two years, hoping that a bribe would be offered to secure his liberty, but at the end of this time Felix was succeeded in the government by Festus, and, in order to gratify the Jewish people, left Paul bound. On returning to Rome Felix was accused of having taken advantage of a dispute between the Jews and any Syrians of Cæsarea to slay and plunder the inhabitants, but through the intercession of his brother Pallas, who had great influence with the Emperor Nero, he escaped unpunished.

FELIX, MINUCIUS. See MINUCIUS FELIX.

FELL, JOHN, Bishop of Oxford, was the son of Dr. Samuel Fell, Dean of Christ Church, and was born at Longworth, in Berkshire, June 23, 1625. He passed from the free school of Thame to Christ Church College at the age of eleven, took his degree of B.A. in 1640, and three years later that of M.A. He served in the royal garrison of Oxford, and attained the rank of ensign. He afterward took holy orders; and being ejected by the parliamentary visitors from his student's place, he lived in retirement at Oxford during the Commonwealth, privately keeping up the services of the Church of England, and administering the sacraments to many Royalists. At the Restoration he was made, in rapid succession, Prebendary of Chichester, Canon and Dean of Christ Church. He had already obtained his degree of D.D., and was also Chaplain to the king. In 1666, he was appointed Vice-Chancellor of the university, and he filled the post for several successive years. He zealously maintained the privileges of the university, and in so doing made himself unpopular with the townsmen. Having shown himself a good scholar, and an earnest upholder of the Church of England, he was nominated, in 1676, Bishop of Oxford. Fell, as a good Aristotelian, was alarmed at the institution and innovations of the Royal Society, and encouraged Stubbe to write against it, making very grave charges against its members. He died at Oxford, July 10, 1686, and his remains were interred in the cathedral.

FELLATAHS, an African tribe.

FELLENBERG, PHILIPP EMANUEL VON, educationalist, was born June 27, 1771, at Bern, in Switzerland. His father was of patrician family, and a man of im-



portance in his canton, and his mother was a granddaughter of the Dutch Admiral Van Tromp. From his mother and from Pfeffel, the blind poet of Colmar, he received a better education than falls to the lot of most boys, while the intimacy of his father with Pestalozzi gave to his mind that bent which it afterward followed. In 1790 he entered the University of Tübingen, where he distinguished himself by his rapid progress in legal studies. On account of his health he afterward undertook a walking tour in Switzerland and the adjoining portions of France, Swabia, and Tyrol, visiting the hamlets and farm-houses, mingling in the labors and occupations of the peasants and mechanics, and partaking of their rude fare and lodging. After the downfall of Robespierre, he went to Paris and remained there long enough to be assured of the storm impending over his native country. This he did his best to avert, but his warnings were disregarded, and Switzerland was lost before any efficient means could be taken for its safety. Fellenberg, who had hastily raised a levy *en masse*, was proscribed; a price was set upon his head, and he was compelled to fly into Germany. Shortly afterward, however, he was recalled by his countrymen, and sent on a mission to Paris to remonstrate against the rapacity and cruelty of the agents of the French republic. But in this and other diplomatic offices which he held for a short time, he was witness to so much corruption and intrigue that his mind revolted from the idea of a political life, and he returned home with the intention of devoting himself wholly to the education of the young. With this resolution he purchased, in 1799, the estate of Hofwyl, near Bern, intending to make agriculture the basis of a new system which he had projected, for elevating the lower and rightly training the higher orders of the state, and welding them together in a closer union than had hitherto been deemed attainable. For some time he carried on his labors in conjunction with Pestalozzi, but incompatibility of disposition soon induced them to separate. The scheme of Fellenberg at first excited a large amount of ridicule, but gradually it began to attract the notice of foreign countries; and pupils, some of them of the highest rank, began to flock to him from every country in Europe, both for the purpose of studying agriculture and to profit by the high moral training which he associated with his educational system. For forty-five years Fellenberg, assisted by his wife, continued his educational labors, and latterly raised his institution to the highest point of prosperity and usefulness. He died November 21, 1844.

FELLER, FRANÇOIS XAVIER DE (1735-1802), a Belgian author.

FELLOWS, SIR CHARLES, a distinguished traveler and antiquary, was born in 1799 at Nottingham, where the family had held an ancestral estate for a considerable time.

In 1838 Fellows, induced by his passion for natural beauty and his preference of a simple peasant life to an artificial civilization, started for Asia Minor, where Smyrna was the center of his travels. His explorations of parts of the interior and south led him to districts practically unknown to Europeans, and he thus discovered ruins of a number of ancient cities which existed earlier than 300 B.C. He entered Lycia and explored the Xanthus from the mouth at Patara upward. Nine miles from Patara, he discovered the ruins of Xanthus, the ancient capital of Lycia, finely situated on hills, and abounding in magnificent remains. About fifteen miles further up he came upon the ruins of Tlos. After taking sketches of the most interesting objects and copying a number of inscriptions, he returned to Smyrna through Caria and Lydia. Actuated by enlightened zeal, he soon brought his discoveries before

European men of letters; and the publication of *A Journal written during an Excursion in Asia Minor* (London, 1839) roused such strong interest in England that Lord Palmerston, at the request of the British Museum authorities, asked the English consul at Constantinople to get leave from the Sultan to ship a number of the Lycian works of art. Late in 1839 Fellows, under the auspices of the British Museum, again set out for Lycia, accompanied by George Scharf, who assisted him materially in sketching. This second visit issued in the discovery of thirteen ancient cities, all enriched by works of art; and, in 1841, appeared *An Account of Discoveries in Lycia, being a Journal kept during a Second Excursion in Asia Minor*. A third visit was made late in 1841, after Fellows had obtained the "firman" by personal application at Constantinople; and he and his party had the pleasure of pitching their tents under the town of Xanthus, on December 30th. They shipped a number of works of art for England, and in the fourth and most famous expedition (1844) twenty-seven cases of marbles were detached for the British Museum, where they are now to be seen in the Lycian Saloon. The most noteworthy places on which the labors of Fellows cast a flood of light are Xanthus, Pinara, Patara, Tlos, Myra, and Olympus. The theaters in Lycian towns show the influence of the Greek drama among the so-called "barbarians;" and Lycian sculpture and architecture almost rival the Greek masterpieces. The arched tombs, one of which is in the British Museum, are compared by Fellows to Gothic architecture. These tombs are very common in Lycia. At Pinara, he says, "rises a singular round rocky cliff literally specked all over with tombs." He died in 1860.

FELO DE SE is one who commits murder upon himself.

FELONY. In English law crimes are divided into felonies and misdemeanors. The difference between them does not depend on their gravity as offenses, nor on the amount of punishment attached to them—it is purely historical. Felonies are those crimes which at common law brought with them after conviction forfeiture of goods.

FELT is a fabric which results from the matting and intimate adhesion of fibrous materials among themselves, and is not, like ordinary cloth, produced by any spinning and weaving processes. All ordinary textile fibers possess sufficient adhesive tendency to enable them to be handled for spinning; but it is only in certain animal fibers that the peculiarity is so marked as to fit them for felting. The property results chiefly from the serrated or jagged structure of wool and hair, and efficient felting is also promoted by the crimped or wavy form which some fibers naturally assume. These properties are best developed in the short "carding" wool of such sheep as the merino and Saxony breeds, long "combing" wools possessing them in a less degree. Unwashed wool, being coated with the natural grease, does not felt. The hair of other animals, as of the rabbit, hare, coypu, vicugna, musquash, and ox, is employed for making felt of various kinds and for different purposes. Felt has been made and used from the most remote antiquity, and indeed, considering the simplicity of the material and the readiness with which wool felts, it is quite probable that it was known before woven fabrics.

FELTHAM, OWEN, a moral writer, was born in 1609 and died in 1677.

FELTRE, the ancient Feltria, a town of northern Italy, in the province of Belluno, and sixteen miles southwest of the town of that name. Population, 5,000.

FELTRE, MORTO DA, a painter of the Venetian school, who worked at the close of the fifteenth century



and beginning of the sixteenth. One of his pictures is in the Berlin Museum, an allegorical subject of Peace and War. Andrea di Cosimo was his pupil and assistant as a decorative painter.

FENCING is the proper use of a small-sword or foil. The small-sword is a light court-dress sword, made to taper gradually from the hilt to the point, and of a size regulated by the judgment of the wearer, if he understand the use of the weapon. The foil with which the art of fencing is practiced is a small quadrangular blade, about the length of a small-sword, and mounted in nearly the same manner; but, for the convenience of the exercise, it is made lighter, blunted, and covered with leather at the point, to prevent accidents in practice.

FÉNELON, BERTRAND DE SALIGNAC, Marquis de La Mothe, a French diplomatist who was ambassador to England during the reign of Elizabeth. At the request of Charles IX. he endeavored to excuse to Elizabeth the massacre of St. Bartholomew as a necessity caused by a plot which had been laid against the life of the king of France. For some time after the death of Charles IX. Fénelon was continued in his office, but he was recalled in 1575 when Catherine de' Medici wished to bring about a marriage between Elizabeth and the Duke of Alençon, and thought that another ambassador would have a better chance of success in the negotiation. In 1582 Fénelon again arrived in England, charged with a private commission from the king of France, chiefly with the view of obtaining the liberation of Mary, Queen of Scots on the promise of a French alliance; but Elizabeth saw reason to doubt the king's sincerity, and Fénelon had to leave England without gaining his purpose. He died in 1589.

FÉNELON, FRANÇOIS DE SALIGNAC DE LAMOTHE, Archbishop of Cambrai, and one of the most celebrated names in the intellectual and ecclesiastical history of France in the seventeenth century, was born at the Chateau de Fénelon in Périgord, August 6, 1651. The family of Salignac or Salagnac, to which he belonged, had been ennobled from the middle of the fifteenth century, and produced already many distinguished names. The father of the future archbishop was Count Pons de Salignac, of whose second marriage, contracted in mature years, François was the only child. From his birth he was of a delicate and sensitive temperament; and, greatly beloved by his old father, he was educated at home till he was twelve years of age. He received, according to one of his biographers, "a simple Christian education devoid of anything remarkable." But he must have been lucky in his tutor or of rare aptitude for learning, for he seems then to have laid the foundation of his admirable scholarship and love of letters. After a short time at the college of Cahors, he went to Paris to complete his studies under the Jesuits at the Collège du Plessis. There his great gifts soon drew to him distinction, and, like his rival Bossuet, he ventured to preach to an admiring audience at the age of fifteen. His father seems to have died before this time, and his uncle, the Marquis de Fénelon, who had assumed the care of his education, withdrew his charge from what might have proved injurious seductions, and placed him in the seminary of St. Sulpice under the saintly Trousson. His uncle was himself a remarkable man. Distinguished as a soldier and a statesman, he became no less distinguished for his piety and moral heroism. In conjunction with M. Olier, the founder of St. Sulpice, he inaugurated and became the first president of an association for the suppression of duelling. The association was composed only of men whose valor was unimpeachable, and whose oath binding them to refuse any challenge or take part in any duel could not therefore be mistaken. The Marquis de Fénelon and his daughter,

who became Madame de Montmorenci Laval, wife of the Marquis de Montmorenci Laval, both exercised a decisive and happy influence over the young Fénelon.

Fénelon's first aspirations were toward a missionary life. The congregation at St. Sulpice had established a missionary society at Canada which many of its pupils had joined, and he wished to follow their steps; and when this project failed he still more earnestly desired to undertake a mission to Greece. In one of his letters, dated October 9, 1675, he draws a glowing sketch of his desire to visit "the glorious scenes," redolent of the spirit of antiquity, which he had so often pictured in imagination, and "to seek out the Areopagus whence St. Paul proclaimed the unknown God to heathen sages." But his delicate health, and the dissuasion of another uncle, the bishop of Sarlat, interfered with his missionary longings. He was induced to remain at home and accept the office of superior of the community of Nouvelles Catholiques, a community founded for the protection and instruction of women converted from Protestantism. He spent ten years (1675-85) of quiet and successful labor in connection with this institution, became intimately associated with a select circle, at the head of which was the Duc de Beauvilliers, began his career as an author, and otherwise laid the foundation of his remarkable influence. It was at the request of the Duchesse de Beauvilliers that he is said to have written his first work, *De l'Education des Filles*, which long maintained its reputation among the higher families of France, and may still be consulted with advantage.

In 1685 Louis XIV. carried out his infamous policy of expelling the Protestants from France by the revocation of the Edict of Nantes. Great disturbance arose in consequence in the districts of Poitou and Saintonge. It was necessary, by firm yet gentle means, to do something to allay the violent irritation which had been caused. On the recommendation of Bossuet, Fénelon was chosen as the head of a mission for this purpose. He made two conditions—that all troops should be withdrawn from the provinces, and that he should be allowed to choose his fellow workers. The result was that his mission was attended with considerable success, although he himself complains more than a year afterward, "Our converts get on very slowly;—it is no easy matter to change the opinions of a whole people." On his return to Paris he had several interviews with the king to report the result of his labors, and afterward resumed in comparative privacy his old duties among the Nouvelles Catholiques. M. de Harlay, the well-known brilliant but profligate archbishop of Paris, who had first advanced him to this position, withdrew his favor from him when he saw he could make no use of him. "It seems, M. l'Abbé, that you wish to be forgotten, and you shall be," was his bitter speech on one occasion; and he so far succeeded as to prevent Fénelon's appointment to the see of Poitiers which had been contemplated by the king.

Suddenly he was called to the responsible position of preceptor of the dauphin's son, the young Duke of Burgundy. This was the work especially of his friend Duc de Beauvilliers, who in 1689 was appointed governor of the royal grandson. But other friends warmly rejoiced in Fénelon's advancement, and among these Bossuet wrote to Madame de Montmorenci Laval congratulating her. "We shall not lose the Abbé Fénelon," he says; "you will be able to enjoy him, and, provincial as I am, I shall escape from time to time to embrace him." It is interesting to notice this renewed trace of hearty friendship between these two illustrious men, considering the unhappy relations which afterward arose between them.

No man probably was ever better fitted than Fénelon



for the difficult position which he now assumed, and to which he mainly devoted himself during the next six years (1689-95). He was born a teacher in the highest sense—gifted with the most charming qualities of patience, sweetness of temper, tact, and address, yet inflexible in principle, and severe and unbending in his method of training. He had the manners of a *grand seigneur*, with all the intellectual refinements of an accomplished churchman. Fénelon carefully planned all the details of his education, and has embodied in his well-known *Télémaque* and other writings the principles on which he based it. It was his aim to train the young prince not merely in habits of self-control, to direct his scholarly acquirements and religious convictions, but, moreover, to awaken in him true and large political instincts fitted to qualify him for his high position. Fénelon himself, while an aristocrat both by birth and feeling, and strongly favorable to the maintenance of these class distinctions which were especially marked in France in the seventeenth century, was at the same time essentially liberal in his recognition of the radical equality of all men, and the moral regards which should regulate the relation of classes to one another. His ideal was that of limited monarchy, surrounded by national institutions, each having its due place and function in the body politic, and representing in due degree public opinion. A written constitution, one sovereign law for all, universal education provided by the State, the reciprocal independence of the temporal and spiritual powers, detestation of war, free industry in agriculture and trade, a people growing in intelligence and self-dependence round the throne and under the guidance of the church—such were the broad principles which he sought to instil into his pupil, and so to make him, in his own language, “a philosophic king,” “a new Saint Louis.” The task was a noble one, and it was pursued with all the fascination, patience, and quiet earnestness which distinguished him.

But a train of circumstances was preparing, destined to impair and finally to overthrow his influence at court, and to banish him from all intercourse with his royal pupil. We can only very briefly indicate the causes which led to this result. A system of religious mysticism known as Quietism had been set afloat toward the end of the seventeenth century by a Spanish priest of the name of Molinos. The system was espoused in France among others especially by Madame Guyon, a remarkable woman devoted to the cause of religion, but of an erratic and restless temperament. Her writings on the subject attracted wide attention, and speedily called forth ecclesiastical condemnation. The archbishop of Paris took up a position of violent hostility toward her; the severe and methodical character of the king was greatly offended by her excesses; and Bossuet was by and by drawn into the circle of her vehement opponents. Strangely it was by Fénelon’s advice that the subject was first brought under Bossuet’s notice. Attracted by Madame Guyon’s genuine enthusiasm, and do doubt finding something in her view of disinterested mysticism which appealed to his own religious temperament, he recommended her to place her writings in the hands of the bishop of Meaux, and to abide by his decision. Many conferences were held on the subject, in which Fénelon at first took no part, and during the progress of which he held friendly communication with his old friend, and in fact supplied Bossuet, who professed his ignorance of the mystical writers, with extracts from the fathers and others bearing on the controversy. The relation of the two friends continued apparently cordial; the atmosphere of the court had not yet changed toward him, for it was at this very time, in the beginning of 1695, that the king nominated

Fénelon for the archbishopric of Cambrai; but gradually out of this miserable business there sprung up a host of embittered feelings. After his appointment as archbishop, Fénelon had joined in the conferences at Issy which finally condemned Madame Guyon’s doctrines. He scrupled, however, to subscribe her condemnation; he scrupled also to express approval of a publication of Bossuet attacking these doctrines; and in vindication of his own position and principles he published his *Maximes des Saints sur la vie intérieure*. The result was to kindle into greater fury the storm of controversy, to provoke the jealous and violent animosity of Bossuet, and to fan the suspicions with which the king had always more or less regarded him into such a vehement outbreak as to lead to his permanent banishment from court, and his condemnation at Rome (1699). He submitted himself to the pontifical decision. But this did not save him either from the continued anger of Bossuet or from the displeasure of the monarch, which were further excited by the publication, through the treachery of a secretary, of his *Télémaque*, under the allegorical disguise of which Louis and his courtiers recognized a satire against the absolutist principles of the French Government.

Fénelon himself disclaimed any such intention. “He had,” he said, “introduced all the virtues necessary for a good government, and the faults to which sovereign power is liable, but none were drawn with the slightest approach to any personality or portraiture. The more the book is examined, the more it will be seen that it only expressed principles fully, without attempting to draw any finished character. My only object was to amuse the Duke of Burgundy with a tale of adventure, and to instruct him at the same time, without ever thinking of giving the work to the public.”

The remainder of Fénelon’s life was spent in his diocese in ceaseless works of Christian piety and charity. Cambrai abounded in Protestants and Jansenists, whom he greatly won by his toleration and evangelical simplicity. It was, moreover, a great thoroughfare for the armies of the time, to the necessities of which, and especially of the sick and wounded, he personally ministered. His own palace was sometimes crowded with invalided officers, who remained his guests for months. He became in consequence endeared to the army and the people. Mingling familiarly with the poorest peasants under his spiritual charge, dispensing with liberality, yet without ostentation, the duties of Christian hospitality, carrying on an extensive correspondence with the clergy and some of his old friends at court, he became more honored in his retirement even than he had been in Paris. Fénelon died in 1715.

FENIANS. Ireland appears to have been the theater of a great ethnic struggle in the first century of the Christian era, in which certain tribes, known to the Romans as Scots, reduced the other inhabitants to subjection. The servile clans are called in Irish story *Aithech Tuatha*, rent-paying tribes, though one of them settled near the River Liffey is specially mentioned as the *Tuath Aithechta*, a name believed to have been the origin of the Latinized tribe-name, *Atticotti*. According to Irish tradition Scotie power appears to have been fully established in the reign of a king called *Tuathal*, the Legitimate, who was slain about 160 A.D. Between this prehistoric king’s reign and the mission of St. Patrick, an interval of about 300 years, was the period of the invasions of Roman Britain by the Picts and Scots, which, though not strictly within the historic period of Irish history, touches upon it so closely that many traditions of the time have come down to us intermingled with a rich and increasing growth of legend embodied in verse and prose tales, known to the Irish speaking peas-



antry as *Sgeulta fiannuigheachta*, stories of the *Fians* or Fennians. The word *Fianna* is glossed in an Irish MS. by *feinneda*, champions, that is, of the king of *Eire*. Instead of *Fian*, *Fianna*, we have also the words in the oblique case *feinn*, *feinne*, from whence has come the English form Fenian. The stories are sometimes also called Ossianic, from a corrupt form of the name of a Fenian poet and warrior named *Oísín*, the Ossian of Macpherson; but though properly applicable to poems, the term cannot be applied to prose tales.

According to popular tradition the *Fians*, or Fenians, were mercenary tribes acting as a permanent military force for the support of the *Ard Rí*, or king of *Eire*. They are supposed to have been instituted by a prehistoric king, *Fiachadh*, the father of the above-named *Tuathal*, or his brother according to another account, and to have enjoyed great power for about 150 years, until, some of them having taken part with the king of Leinster against the king of *Eire*, they nearly annihilated each other in the battle of Gabhra, which is perhaps only another way of saying that the king, jealous of their power, broke up the organization. The term *Fian* continued, however, to be sometimes applied by the poets to the *Amos*, or mercenary troops, which the provincial kings, as well as the king of *Eire*, kept about them.

The Irish MSS. contain no account of the organization or distribution of the Fenians, except what can be gathered from incidental references; but Doctor Keating, who appears to have had access to many MSS. since lost, and who may be trusted to tell only what he found in them, gives in his *History of Ireland* a curious legendary account to which the reader is referred. It was this account which suggested calling the members of an organization that was formed a few years ago among the Irish in the United States of America for promoting and assisting revolutionary movements in Ireland, and which attained much notoriety, Fenians (see IRELAND). The founder of the modern Fenians, John O'Mahony, was also the author of a translation of Keating's *History*, which he published in New York in the year 1857.

FENNEL (*Faniculum*), a genus of umbelliferous plants, having umbels compound, and without involucre; petals yellow, entire, roundish, and incurved at the tip; and fruit a laterally compressed cremocarp, with achene five-ridged, a large, single vitta under each furrow, and albumen plano-convex (see BOTANY). Common Fennel, *F. vulgare*, Gärtn. (*Anethum Faniculum*, L.), to which the other forms of fennel are generally referred, is a perennial from two to three, or when cultivated, four feet in height, having leaves three or four times pinnate, with numerous linear or awl-shaped segments, and umbels glaucous, and of about fifteen or twenty rays. The plant appears to be of South European origin, but is now met with in various parts of Britain and the rest of temperate Europe, and in the west of Asia.

FENTON, ELIJAH, an English poet, was born at Shelton, near Newcastle-under-Lyme, Staffordshire, May 20, 1683. He entered Jesus College, Cambridge, with the view of studying for the church, but afterward declined to take orders, and on leaving the university he accompanied the Earl of Orrery to Flanders in the capacity of private secretary. On the return of the earl to England, in 1705, Fenton became assistant in a school at Headley, in Surrey, and was soon afterward appointed master of the free grammar-school, at Sevenoaks, in Kent. In 1710 he was induced by the promise of a political appointment from Lord Bolingbroke to resign his mastership, but a change in the government led to the disappointment of his hopes. He was, how-

ever, not long afterward appointed tutor to Lord Broghill, only son of the Earl of Orrery; and when this engagement expired, he was, on the recommendation of Pope, employed to give private literary instructions to Mr. Craggs, secretary of state. His next engagement was with Pope himself, whom he assisted in translating the *Odyssey*. The first, fourth, nineteenth and twentieth books are ascribed to Fenton. In 1727 Fenton superintended a new edition of Milton's poems, to which he prefixed a life, and in 1729 he published a splendid edition of Waller, with notes. During the latter part of his life he was employed by Lady Trumbull, first as tutor to her son, and afterward as auditor of her accounts. He died at East Hampstead, Berkshire, on July 13, 1730, and was interred in the parish church, where his tomb has inscribed on it an epitaph written by Pope.

FENTON, SIR GEOFFREY, a writer and statesman during the reigns of Elizabeth and James I., the brother of Edward Fenton the navigator, who accompanied Sir Martin Frobisher in his expeditions, and was afterward sent out independently to endeavor to discover a north-west passage. In the capacity of queen's counselor Sir Geoffrey served for twenty-seven years in Ireland, where his conduct appears to have given great satisfaction to his royal mistress, notwithstanding that he took every opportunity of impressing on her mind the strong conviction he entertained that the safety and glory of her government in that island depended on her subjects enjoying the protection of equal laws. He died at Dublin, October 19, 1606.

FENUGREEK (*Trigonella*), a genus of leguminous herbs very similar in habit and in most of their characters to the species of the genus *Medicago*. The leaves are formed of three obovate leaflets, the middle one of which is stalked; the flowers are solitary or in clusters of two or three, and have a campanulate, five-cleft calyx; and the pods are many-seeded, cylindrical or flattened, and straight or only slightly curved. The fenugreeks or trigonels are widely diffused over the south of Europe, West and Central Asia, and the north of Africa, and are represented also by several species in Australia.

FEOFFMENT, in English law, was the form of granting or conveying a freehold or fee.

FERDINAND. The name of Ferdinand (the Italian *Ferdinando* or *Ferrante*, Spanish *Fernando* or *Hernando*, Arabian *Ferdeland*), which is supposed to be of Gothic origin and to be allied to the German *verdienend* (meritorious), has been borne by a considerable number of European sovereigns, the more important of whom are noticed below in the following order—first, the emperors, and then the kings of Naples, Portugal, and Spain, the grand-dukes of Tuscany, and the duke of Brunswick.

FERDINAND I., emperor, was the son of Philip of Austria and Joanna, daughter of Ferdinand and Isabella of Spain, and was born at Alcalá in Spain March 10, 1503. In 1521 he married Princess Anna of Hungary, and on the death in 1526 of her only brother the boy-king Louis of Bohemia and Hungary he was elected king of Bohemia, but in Hungary his claims were opposed by John Zapolya, palatine of Transylvania. Zapolya suffered a severe defeat from the imperial troops near Tokay; but after receiving the aid of the Turks he managed to carry on the struggle with varying success until 1538, when the exhausted resources of both rival parties led to a compromise, by which it was agreed that a half of the kingdom should be assigned to each, and that on the death of John the half over which he ruled should revert to Ferdinand. But on the death of John in 1540 the Turks supported the



cause of his infant son John Sigismund, and in 1547 Ferdinand was compelled to purchase peace at the price of a yearly tribute. The war was again renewed in 1552, and at its termination the Turks were allowed to retain possession of a part of Hungary in trust for Sigismund. In 1521 Ferdinand had been chosen president of the council of regency appointed to govern Germany during the absence in Spain of his brother the Emperor Charles V., and in 1531 he was, through the influence of his brother, elected king of the Romans, in which capacity he acted the part of mediator between the emperor and the German princes, and in 1552 negotiated a treaty between him and the Elector Maurice of Saxony. On the abdication of Charles in 1556 Ferdinand was elected emperor. Pope Paul IV. refused ecclesiastical recognition to the election on the ground that it was made without the consent of the papal see, but happily Paul died before the dispute had time to lead to serious consequences, and his successor Pius IV. avoided an open rupture by recognizing its validity on condition that Ferdinand should not observe the treaty of Augsburg. Ferdinand during his short reign showed himself an able, just, and enlightened ruler. He reorganized the aulic council, effected a reform in the monetary system of Germany, and exerted himself to bring about a reconciliation between his Protestant and Roman Catholic subjects. To effect this he endeavored on the one hand to obtain from the pope various concessions to the Protestants, among others permission for the laity to use the cup at the communion, and liberty of marriage for the priests; and on the other hand he sought to persuade the Protestants to send deputies to the council of Trent; but his death, July 25, 1564, prevented these negotiations having a satisfactory termination.

FERDINAND II., emperor, was the grandson of the preceding and the son of Charles, Duke of Styria, and of Mary of Bavaria, and was born at Gratz July 9, 1578. He was educated by the Jesuits, and having imbibed strong anti-Protestant sentiments is said to have taken a solemn vow before the altar that, on receiving the imperial crown, promised him by his cousin Matthias II., he would, at whatever cost, reestablish the Roman Catholic religion throughout all his states. In 1618 Matthias abdicated the thrones of Bohemia and Hungary in his favor, and on the death of Matthias, in 1619 he laid claim to the imperial crown. His keen Roman Catholic sympathies, allied to a character gloomy, fanatical, and cruel, had already led him to disregard the guarantees of toleration by which his election to the thrones of Bohemia and Hungary had been acceded to; and on that account the Bohemians, shortly after the death of Matthias, rose in revolt, and under the leadership of Count Thurn besieged him in Vienna, until the arrival of an army under General Bouquoi forced them to retreat, and enabled him to proceed to Frankfort to receive the imperial crown. The Bohemians, notwithstanding their defeat, chose as their king the elector-palatine, Frederick V., son of James I., of Scotland, and with the assistance of Bethlen Gabor, prince of Transylvania, who revolted against Ferdinand in Hungary, virtually inaugurated the long struggle for religious liberty known as the Thirty Years' War. Ferdinand, however, with the support of the Catholic league and the alliance of John George I., Elector of Saxony, was able completely to subdue them after a short campaign, and having totally defeated them near Prague, November 8, 1620, he deprived them of their constitutional rights, banished the leading Protestant families, expelled the Reformed preachers and recalled the Jesuits, and by cruel persecutions totally quelled every manifestation of Protestant belief. But in Hun-

gary he was not so successful as to enable him to put such extreme measures into execution; on the contrary, he thought it prudent to conclude a peace on December 31, 1621, by which he agreed to cede one half of the country to Bethlen Gabor, and to grant religious toleration to the other half. In Germany fortune was for a time more favorable to the Roman Catholic cause; several of the German princes had entered into a league with Christian IV. of Denmark, but that monarch was defeated by Ferdinand's general, Wallenstein, and a peace between him and Ferdinand was concluded in 1629.

Taking advantage of his opportunity, Ferdinand in the same year passed the famous Edict of Restitution, which enforced the restoration of all German ecclesiastical property that had passed into other hands since the treaty of Passau in 1552. The full execution of the edict was, however, prevented—partly by the unwillingness of the Roman Catholic princes to give up the property of which they had become possessed, partly by the intrigues of Cardinal Richelieu, who was jealous of the increasing influence of the emperor, but principally through the arrival of Gustavus Adolphus. Uniting with the Protestant princes of Germany, Gustavus inflicted a succession of defeats on Ferdinand, who, having at the urgent representations of the Catholic princes dismissed Wallenstein from the command of the imperial army, possessed no general at all adequate to cope with the genius and energy of the King of Sweden. Gustavus was subsequently joined by the Elector of Saxony, and fortune failed to smile on the arms of Ferdinand, even after the recall of Wallenstein, who was defeated at the battle of Lützen, November 16, 1632. The victory was dearly bought by the death of the King of Sweden, but Wallenstein took little advantage of the great loss thus sustained by the Protestant cause; and the emperor, learning that he finally meditated treachery, caused him to be assassinated, February 25, 1634. In the same year the imperial army was successful at the battle of Nordlingen, and after this victory the Elector of Saxony separated himself from the Swedish alliance and made peace with Ferdinand; but the Swedes continuing the struggle with great determination, and being afterward joined by France, Ferdinand, when he died on February 15, 1637, was un comforted by the hope of any near fulfillment of the purpose expressed in his oath, and attempted by such ruthless persecutions and at such an expense of treasure and of human life.

FERDINAND III., emperor, the son of the preceding, was born at Gratz, July 11, 1608. He became king of Bohemia in 1625, king of Hungary in 1627, king of the Romans in 1636, and succeeded his father as emperor in 1637. Milder in disposition, less fanatical in his opinions and somewhat dispirited on account of the repeated defeats inflicted on the German arms by Duke Bernhard and General Baner, he was at an early period of his reign strongly desirous of obtaining peace even at the cost of liberal concessions to the Protestants; but the determination of France and Sweden to humiliate the imperial power prevented negotiations being entered into until 1643. Between that date and 1648 fruitless conferences continued to be held, the war meanwhile raging intermittently and with somewhat spent fury. In 1647, however, Ferdinand had guaranteed religious toleration to Hungary, and finally, on October 24, 1648, the Peace of Westphalia was signed, by which was brought to a close a war that, besides the evils inflicted by it on other countries, had desolated the whole of Germany, paralyzed its trade, and destroyed more than half its population. By this treaty religious liberty was secured to Germany, although not to Bohemia; France obtained part of Alsace and Lorraine, and the



son of Frederick V. got the Upper Palatinate; while Sweden obtained Western Pomerania, and became a member of the German diet. The unity of Germany was at the same time so broken up by concessions granted to the independent princes that with the death of Ferdinand III. the German kingdom may be said to have ceased to exist, until reestablished by William I. after the Franco-Prussian war. During the peace negotiations of Westphalia, Ferdinand IV., eldest son of Ferdinand III., was chosen king of the Romans, but he died in 1654. Ferdinand III. died April 2, 1657, shortly after concluding a treaty with the Poles against Sweden.

**FERDINAND I.**, Emperor of Austria, the eldest son of the Emperor Francis I. by his second wife Maria Theresa, daughter of Charles VI., was born in Vienna, April 19, 1793. He inherited a constitution so weak as to unfit him for the duties of his station, but his amiable and benevolent disposition secured him general respect, and acquired for him the surname of the Good. On February 2, 1831 he married Princess Anne Caroline, third daughter of Victor Emmanuel of Sardinia, but the marriage was without issue. He was crowned nominal sovereign of Hungary under the title of Ferdinand V. in 1830, succeeded his father as emperor of Austria on March 2, 1835, and received the crown of Bohemia in 1836, and that of Lombardy in 1839. During his whole reign the government of Austria was virtually in the hands of Prince Metternich, who continued the conservative policy of Francis I. The revolution of March 13, 1848, compelled Metternich to resign office, and, the constitution not meeting with the approval of the revolutionists, Ferdinand fled to Innsbruck. At the urgent request of all parties he shortly afterward returned to Vienna, but on a renewal of the outbreak he left the capital for Olmütz in Moravia, where, feeling himself unfit to cope with the difficulties of government, he was persuaded to abdicate in favor of his nephew Francis Joseph, December 2, 1848. He spent the remainder of his life in retirement, chiefly at Prague in Bohemia, where he died June 29, 1875.

**FERDINAND I.**, King of Naples, the illegitimate son of Alphonso V. of Aragon and I. of Sicily and Naples, was born in 1423. In accordance with his father's will he succeeded him on the throne of Naples in 1458, but Pope Calixtus III. having refused to recognize him, John of Anjou, desirous to turn to advantage the opportunity of regaining the throne of his ancestors, invaded the country, and inflicted on him a severe defeat, July 7, 1460. Ferdinand fled to Naples accompanied by only twenty cavaliers, but having by certain concessions obtained recognition from Pius II., who about this time succeeded Calixtus on the papal throne, he received through him the aid of the Albanian chief Scanderbeg, and defeated John of Anjou at Troja with great loss, August 18, 1462. In 1480 the Turks captured Otranto from Ferdinand, and massacred the majority of the inhabitants, but in the following year it was retaken. The only other event of importance during his reign was an abortive attempt at revolt on the part of the nobles in 1485, many of whom, notwithstanding that he promised them a general amnesty, were afterward treacherously murdered by his commands. On account of his refusing to pay to Innocent VIII. the census-tax promised by him to Pius II., he was in 1489 excommunicated, but he subsequently gained the favor of Alexander VI. He died January 25, 1494, while Charles VIII. of France was preparing to invade his dominions.

**FERDINAND II.**, King of Naples, grandson of the preceding, and son of Alphonso II., was born probably in 1468. Alphonso finding his tenure of the throne un-

certain on account of the general dissatisfaction of his subjects, abdicated in his son's favor in 1495, but notwithstanding this the treason of a party in Naples rendered it impossible to defend the city against the approach of Charles VIII. Ferdinand fled to Ischia; but when the French left Naples, the Neapolitans, irritated by their conduct during the occupation of the city, recalled him; and with the aid of the great general of Ferdinand V. of Spain, Gonzalo de Cordova, he was able completely to rid his state of its invaders shortly before his death on October 7, 1496.

**FERDINAND III.** of Naples. See **FERDINAND V.** of Spain.

**FERDINAND IV.** of Naples, III. of Sicily, and I. of the Two Sicilies, third son of Don Carlos, King of Naples (afterward Charles III. of Spain), was born in Naples, January 12, 1751. His minority ended on January 12, 1767, and in 1768 he married Maria Caroline, daughter of the Empress Maria Theresa. According to the marriage contract the queen, after the birth of her first son, was to have a voice in the councils of state, and she was not backward to make use of this opportunity of political influence. Beautiful, clever, and ambitious, and inheriting many of the masculine characteristics of her mother, she soon ousted Tanucci both from the favor of the king and from all but nominal authority in the state, and when he systematically attempted to frustrate her purposes, he was finally in 1777 dismissed from his office. The Englishman Sir John Acton was shortly after this appointed admiral of the Neapolitan fleet, and succeeded so completely in winning the favor of both queen and court, that he was speedily promoted to be minister of war, and then of foreign affairs. Under his influence Spain lost her ascendancy in Neapolitan politics, and an intimate connection was formed with Austria and England. In 1793 Ferdinand joined the coalition against France, and although he made peace with France in 1796, he took advantage of the absence of Napoleon in Egypt to renew the war in 1798. His army occupied Rome for a short time, but after the defeat of some of its divisions by the French, Ferdinand, without attempting to defend Naples, to which he had fled panic-stricken, escaped on board the English fleet under Admiral Nelson, and went to Palermo, and the French, entering the city after a furious but undisciplined resistance by the *lazzaroni*, established with the aid of the citizens and nobles the "Parthenopean Republic." When, six weeks after this, the defeat of their arms in the north of Italy compelled the French to abandon Naples, Ferdinand was restored by a Calabrian army under Cardinal Ruffo, and with the connivance of Admiral Nelson a reign of terror was inaugurated, which continued until the success of the French arms in 1801 induced Ferdinand to sign a treaty whereby, besides other concessions he promised to grant an amnesty to political offenders, and also agreed to permit French troops to occupy his territories. But when war broke out between France and Austria in 1805, he thought the opportunity favorable for throwing off the French domination, and prompted by Caroline permitted 30,000 Russian and English troops to land at Naples. Scarcely had he done so, when the victory of Austerlitz enabled Napoleon to despatch an army against him. Ferdinand with his usual precipitation fled from his capital, leaving Caroline to negotiate terms with the enemy, but as Napoleon refused all further compromise with the house of Bourbon she was compelled to follow her husband into Sicily. On March 30, 1806, Joseph Bonaparte was proclaimed king of Naples and Sicily, but Ferdinand, with the aid of England, continued to reign over the latter kingdom. After the dethronement in 1815 of Murat, who had succeeded Joseph Bonaparte as king of



Naples in 1808, Ferdinand was recalled to his capital, and on December 12, 1816, he united his two states into one, and assumed the title of King of the two Sicilies. As a condition of his recall he had sworn to grant a constitution, but no sooner did he find himself secure from external interference than he abolished it, and although a revolution compelled him again in 1820 to give to it a nominal assent, he was shortly afterward able, with the help of an Austrian army, to break his promises with impunity, and by means of an elaborate system of espionage and the unscrupulous arrest and punishment of all suspected persons to reestablish his despotism in a more vigorous form than ever. He died January 4, 1825.

FERDINAND II., King of the Two Sicilies, grandson of the preceding, and son of Francis I., was born at Palermo, January 12, 1810. On succeeding his father in 1830, he published an edict in which he promised to "give his most anxious attention to the impartial administration of justice," to reform the finances, and to "use every effort to heal the wounds which had afflicted the kingdom for so many years;" but these promises seem to have been meant only to lull discontent to sleep, for while the existing burden of taxation was only slightly lightened, corruption began gradually to invade all departments of the administration, and an absolutism was finally established harsher than that of all his predecessors, and supported by even more extensive and arbitrary arrests. Ferdinand was naturally shrewd, but badly educated, grossly superstitious, and possessed of inordinate self-esteem. Though he kept the machinery of his kingdom in a high state of efficiency, he made little account of the wishes or welfare of his subjects, and did not deem it of much importance to be on good terms either with them or with foreign states. In 1832 he married Christina, daughter of Victor Emmanuel, and shortly after her death in 1836, he took for a second wife Maria Theresa, daughter of Archduke Charles of Austria. After his Austrian alliance the bonds of despotism were more closely tightened, and the increasing discontent of his subjects was manifested by abortive attempts at insurrection in 1837, 1841, 1844 and 1847, and in 1848 by a general rising in Sicily, on account of which the king judged it prudent to promise a constitution. A dispute, however, arose as to the nature of the oath which should be taken by the members of the chamber of deputies, and as neither the king nor the deputies would yield, serious disturbances began to occur in the streets of Naples; and the king, making these the excuse for withdrawing his promise, on March 13, 1849, dissolved the national parliament. The efforts at revolt were renewed in Sicily, but were speedily quelled, chiefly by the bombardment of the principal cities of the state, an expedient which won for Ferdinand the epithet of "Bomba." During the last years of his reign espionage and arbitrary arrests prevented all serious manifestations of insubordination among his subjects. In 1851 the political prisoners of Naples were calculated by Mr. Gladstone to number 13,000, and so great was the scandal created by the rule of terror which prevailed that in 1856 France and England, though vainly, made diplomatic representations to induce a mitigation of its rigor and the proclamation of a general amnesty. An attempt was made to assassinate Ferdinand in 1857. He died May 22, 1859.

FERDINAND I. of Portugal, sometimes referred to as *el Gentil* (the Gentleman), son of Pedro I. of Portugal (who is not to be confounded with his Castilian contemporary Pedro the Cruel), succeeded his father in 1367. On the death of Pedro of Castile in 1369, Fer-

dinand as great-grandson of Sancho IV. by the female line, laid claim to the vacant throne, for which the kings of Aragon and Navarre, and afterward the Duke of Lancaster (married in 1370 to Constance, the eldest daughter of Pedro), also became competitors. Meanwhile Henry of Trastamara, the brother (illegitimate) and conqueror of Pedro, had assumed the crown and taken the field. After one or two indecisive campaigns all parties were ready to accept the mediation of Pope Gregory XI. The conditions of the treaty ratified in 1371, included a marriage between Ferdinand and Leonora of Castile. But before the union could take place the former had suddenly become passionately attached to Leonora Tellez, the wife of one of his own courtiers, and having procured a dissolution of her previous marriage, he lost no time in making her his queen. This strange conduct, although it raised a serious insurrection in Portugal, did not at once result in a war with Henry; but the outward concord was soon disturbed by the intrigues of the Duke of Lancaster, who prevailed on Ferdinand to enter into a secret treaty for the expulsion of Henry from his throne. The war which followed was unsuccessful; and peace was again made in 1373. On the death of Henry in 1379, the Duke of Lancaster once more put forward his claims; and again found an ally in Portugal; but according to the Continental annals, the English proved as offensive to their companions in arms as to their enemies in the field; and Ferdinand made a peace for himself at Badajoz in 1382, it being stipulated that Beatrix, the heiress of Ferdinand, should marry King John of Castile, and thus secure the ultimate union of the crowns. On the death of Ferdinand at Lisbon in the following year (October 22, 1383), leaving no male issue, the direct Burgundian line, which had been in possession of the throne since the days of Count Henry (about 1112), became extinct. The stipulations of the treaty of Badajoz were set aside, and John, grand-master of the order of Aviz, Ferdinand's illegitimate brother, was proclaimed. This led to a war which lasted for several years.

FERDINAND I. of Aragon and Sicily, surnamed the Just, the younger son of John I. of Castile and Leonora of Aragon, was born in 1379. On the death of his elder brother Henry III. in 1406, he refused the crown of Castile which the nobles had offered, but in accordance with his brother's will undertook the office of regent during the minority of his nephew John II. In this capacity he distinguished himself by his prudent administration of home affairs, and by his victories over the Moors by land and sea. He took the title *de Antequera* on the surrender of that fortress after a siege of five months (1410). On the death of his maternal uncle, King Martin of Aragon and Sicily, his claims to the throne, though not derived from the usual laws of descent, were taken up and keenly pressed by a powerful party in the state. The question of succession was ultimately referred to a committee of nine judges equally representing Catalonia, Valencia, and Aragon; and the result was his election by a majority (1412). After he had defeated, at Balaguer, Count Jayme of Urgel, the last and most formidable of his rivals, he was formally crowned at Saragossa in 1414.

From the year 1378 Europe had been scandalized by the spectacle of the papal schism; and since 1410 three rival popes had been claiming the obedience of the faithful. At the council of Constance in 1414, Ferdinand of Aragon was a prominent supporter of the Spaniard, Benedict XIII. (Peter de Luna), who had been deposed at Pisa in 1408. The deposition of John XXIII., and the abdication of Gregory XII. in 1415, having paved the way for peace, Ferdinand consented to be present at the meeting of Sigismund with the ambassadors of



France, Castile, and Navarre in Perpignan; and after long temporizing he ultimately agreed, for the sake of the unity of the church, to withdraw his obedience from Luna. He died in the following year at Ygualada (April 2, 1416), and was succeeded by his son Alphonso V., the conqueror of Naples.

FERDINAND II. of Aragon and Sicily. See FERDINAND V. of Castile.

FERDINAND I., surnamed the Great, first sovereign of independent Castile, was the second son of Sancho III. (el Mayor) of Navarre, who about 1026 compelled Bermudo III. of Leon, the last direct descendant of Pelayo in the male line, to surrender his rights over Castile, and also to give his sister Sancha in marriage to Ferdinand, then regent of that province. Sancho, toward the close of his energetic life, divided his extensive dominions among his four sons, Castile being the portion allotted to the second (1035). Bermudo of Leon, shortly after Sancho's death, sought to recover his lost possessions, but was defeated and slain in the attempt at Lantada near Rio Carrion (1038). Ferdinand, now king of Leon as well as of Castile, by a conciliatory yet firm policy, soon established his authority over his conquered subjects; and when in 1053 his dominions were invaded by his brother Garcia III. of Navarre, the attack issued in the death of the latter on the battlefield of Atapuerca near Burgos, and the annexation of a large portion of his dominions. At an early period of his reign Ferdinand began to direct his arms against the Moors; and by a series of successful campaigns he extended the Christian frontier from the Douro to the Mondego, and reduced to vassalage the emirs of Toledo, Saragossa, and Seville. Even the Arab chronicles mention his victories from Badajoz in Estremadura to Albarracin in Aragon. He had set out on an expedition against Valencia when he was seized with a mortal illness which compelled him to retire to his capital (Leon), where after having divided his dominions among his three sons, he died on December 27, 1065.

FERDINAND II., younger son of Alphonso VIII., became king of Leon on the death of his father in 1157. The history of his reign of thirty-one years is obscure. A dispute that arose between him and some of his powerful nobles gave his brother Sancho III. of Castile a pretext for invading his territory (1158), but the timely submission of Ferdinand averted serious disaster. The death of Sancho shortly afterward led to a military occupation of Castile by Ferdinand, professedly in the interests of his nephew Alphonso III.; and this occupation lasted till the marriage of Alphonso to Leonora, daughter of Henry II. of England, in 1170. Meanwhile Ferdinand, having repudiated his wife Doña Urraca, had become involved in a war with his father-in-law Alphonso I. of Portugal, which resulted in the defeat and capture of the latter at Badajoz in 1169. The later years of the reign of Ferdinand II. were distinguished by sundry successes over the Moors, especially by a brilliant victory at Santarem (1181); and also by the incorporation of the great military order of Alcantara, which received its first regular charter from Pope Alexander III. in 1177. He died at Benavente (Leon) in 1188, and was succeeded by his son Alphonso IX.

FERDINAND III. (1200-1252), usually known as Saint Ferdinand, was the son of Alphonso IX., of Leon, and of Berenguela, sister of Henry I., of Castile. On the death of Henry without issue in 1217, the just title of Blanche, the elder of the surviving sisters, was set aside, and Berenguela procured the proclamation of Ferdinand. He rapidly secured the homage of the towns and the submission of the nobles, especially of the brothers, Alvaro and Ferdinando de Laura. On the death of his father in 1230 he ultimately, though not

without dispute, became king of Leon as well as Castile, thus finally uniting the two kingdoms under one crown. Following up the advantage which had been gained for the Christian arms by his father and the allied kings in the great battle at Las Nevas de Tolosa in 1212, he devoted all his energies to the prosecution of the Moorish war. Among his conquests may be mentioned those of Ubeda in 1234, of Cordova in 1236, of Jaen in 1245, and of Seville in 1248. He was planning an invasion of Africa when he died at Seville on May 30, 1252, leaving his kingdom to his eldest son, Alphonso X. (Alonso el Sabio.)

FERDINAND IV., sometimes called *el Emplazado*, i.e., Cited or Summoned, succeeded his father Sancho IV., on the throne of Castile and Leon in 1295. The years of his minority were disturbed by a series of civil wars caused by the pretensions of his cousins, Don Juan and Don Alonso de la Cerda to the crown, by the disputes of the Haros, Laras, and other nobles about their privileges, by the restlessness of the municipalities, and by the ambition of the neighboring kings of Portugal, Aragon, and Granada. The queen mother, Maria de Molina, on each new outbreak succeeded in procuring peace by diplomatic tact and judicious compromise. Secure at last in possession of his throne, Ferdinand was free to pursue the traditional policy of war against the Moors; and in carrying it out he was aided by pecuniary grants, both from his own nobles and also from the pope (Clement V.), as well as by the spoils of the Templars on the extinction of that order in 1310. His chief exploit, as recorded by the historians, both Spanish and Arab, was the expedition against Algeciras (1309) which, while unsuccessful in its main object, resulted in the surrender of Gibraltar and the cession of other strongholds. In the course of a subsequent campaign he died suddenly at Jaen, September 7, 1312.

FERDINAND V. of Castile, III. of Naples, II. of Aragon and Sicily, surnamed *el Catolico*, the younger son of John II. of Navarre and Aragon, by his second wife Juana Henriquez of Castile, was born at Sos in Aragon on March 10, 1452. On the death of his elder brother Carlos in 1461, he was recognized by the Aragonese as heir-apparent to the crown, but the Catalans, rendered indignant by the cruelty and perfidy with which Carlos had been treated, refused to recognize any further claim on their allegiance, and rose in rebellion against King John. Ferdinand accompanied his father in the campaigns which followed, and gave early promise of distinction. In 1466 his father formally associated him with himself in the government of Aragon, and in 1458 declared him king of Sicily. In October, 1469, he was married at Valladolid, in circumstances of unusual secrecy, to Isabella, sister of Henry IV. of Castile, and heiress to that throne. On the death of Henry IV., in 1474, Ferdinand and Isabella were recognized by the nobles in the junta of Segovia as joint-sovereigns of Castile; but a powerful party, including the Marquis of Villena, the Grand-Master of Calatrava, the Archbishop of Toledo, and numerous other notables, as well as some of the burghs, declared in favor of Juana "la Beltraneja," whom Henry had shortly before his death recognized as his own child, and by his will designated as his successor. Juana had also the support of Alphonso V. of Portugal (to whom she was betrothed in 1470) and of Louis XI. of France. The result was a civil war which continued with varying fortunes until victory finally declared for the Catholic sovereigns, and the peace of Lisbon was signed in 1479. In the same year, a few months previously, Ferdinand had succeeded his father on the throne of Aragon, though not on that of Navarre, which went to his sister Leonora de Foix. The union of Castile and Aragon, together with the



prosperous termination of the civil war, gave the Catholic sovereigns leisure and opportunity for the development of a vigorous domestic policy. On their accession they had found themselves face to face with an almost anarchical condition of affairs: bitter feuds were raging in Andalusia between the great houses of Cadiz and Medina Sidonia; Galicia and other provinces were rent with hostile factions; robbery and outrage were paralyzing commerce and agriculture throughout the kingdom. One of their earliest measures for restoring the much needed order was the reorganization and development (1476) of the ancient *hermandad* (brotherhood), a league which had been originally formed by some of the cities for mutual protection against the aggression of the nobles and of the crown, and which had already more than once, by means of its "cortes extraordinary," made its power to be felt.

It was now augmented and mobilized as a body of military police for the detection and repression of all crimes against persons or property committed on the highways or in the open country. For these ends it proved very useful; and also for another purpose, which is believed to have been aimed at in its constitution, that of checking the arrogance and rapacity of the feudal aristocracy. The next step for the avowed purpose of securing orderly government was the institution of the famous Inquisition as a tribunal for the repression of heresy (and, as some historians do not hesitate to add, for the extortion of money). The necessary bull was obtained from Sixtus IV. in 1478; the court was instituted at Seville in 1480, where the first *auto de fe* took place in the following year. The arrangement was extended to Aragon in 1483, Torquemada being appointed first inquisitor-general. Among other measures taken by Ferdinand and Isabella for the consolidation of their power was the assumption of the grand-masterships of the three great military orders of knighthood, and the vindication from papal usurpation of their ancient rights of ecclesiastical patronage. One result of their firm and on the whole wise policy, was that between the years 1477 and 1482 the revenue of the country had been augmented nearly six-fold, and that in 1481 they were free to resume the long-suspended war against the Moors. From the capture of Alhama to the fall of Granada in 1492 (January 1st), the Christian arms had met with a series of uninterrupted successes which resulted in the final extinction of the Mahometan power in Spain—the Moors, however, being permitted the enjoyment of certain stipulated privileges, that of the free exercise of their religion being one. In March, 1492, the edict for the expulsion of the Jews was signed at Granada, and it was on August 3d in the same year that Columbus sailed from Palos in Andalusia, landing on the island of San Salvador on October 12th. In 1493 Ferdinand began to look abroad and take a practical interest in European affairs. By the treaty of Senlis he secured from Charles VIII. the restoration of Roussillon (now the department of Pyrénées Orientales) and of Cerdagne (now part of Catalonia), which had been mortgaged by John II. of Aragon to Louis XI. In 1494 Charles VIII. having undertaken his great Italian expedition, Ferdinand entered into an alliance with the emperor, the pope, and the states of Milan and Venice, and thus gained a footing in Italy for the Spanish troops which, under Gonsalvo de Cordova, succeeded in expelling Charles from Naples in 1496. By the peace of 1498, however, the throne of that kingdom was left in possession of Frederick. In 1499 the liberty of worship which had been guaranteed to the Moors of Granada was treacherously withdrawn; serious risings in the Alpujarras (Sierra Nevada) were the consequence (1501); a decree was issued in

1502 offering to the conquered insurrectionists the alternatives of baptism or exile; and, the latter being usually chosen, Spain had to suffer a second time the loss of many of her most useful subjects. The Neapolitan war again broke out in 1500, and an alliance was formed between Ferdinand and Louis XII. on the basis of a partition of their conquests. This pact was broken by Ferdinand, who by the battles of Cerignola and Garigliano became sovereign of Naples (Ferdinand III.) in 1504. The death of Isabella took place on November 23d of the same year; and in accordance with her will Ferdinand immediately caused his daughter Juana to be proclaimed queen and himself regent. Philip, Archduke of Austria, the husband of Juana, having disputed the rights of his father-in-law and threatened an appeal to arms, the latter in disgust, with the view of again separating the crowns of Aragon and Castile, entered into negotiations with Louis XII., married Germaine de Foix, the niece of Louis (1505), and shortly afterward resigned the regency of Castile. On the death of Philip, in 1506, he resumed the administration, though not without opposition, and retained it till his death. In 1508 he joined the league of Cambray for the partition of Venice, and thus without any trouble became master of five important Neapolitan cities. In the following year (1509) the African expedition of Cardinal Ximenez was undertaken, which resulted in the conquest of Oran. In 1511 Ferdinand joined Venice and Pope Julius II. in a "holy league" for the expulsion of the French from Italy. This gave a pretext for invading Navarre, which had entered into alliance with France, and been laid under papal interdict in consequence. Aided by his son-in-law Henry VIII. of England, who sent a squadron under the Marquis of Dorset to co-operate in the descent on Guienne, Ferdinand became master of Navarre in 1513; and on June 15, 1515, by a solemn act in cortes held at Burgos, he incorporated it with the kingdom of Castile. He died at Madrigalejo (Estremadura) early in the following year, January 23, 1516. It is said that his death was accelerated by a potion which in his desire for posterity he had taken in order to reinvigorate his exhausted constitution. He was succeeded by his grandson, Charles I. of Spain, more generally known by his European title as the Emperor Charles V.

FERDINAND VI., King of Spain, sometimes called the Sage, the younger son of Philip V. and Maria Louisa of Savoy, was born at Madrid, September 23, 1713. On the death of his elder brother Louis in 1725, Ferdinand was proclaimed prince of the Asturias; and in 1729 he was betrothed to Barbara, daughter of John V. of Portugal. He succeeded his father on July 9, 1746. Since 1739 Spain had been involved in protracted war, first with England in consequence of disputes relative to British interests in the West Indies, and afterward, since 1740, with Austria on the accession of Maria Theresa. It was Ferdinand's first endeavor on coming to the throne to secure peace for his exhausted country, and one of the earliest acts of his government was to order the withdrawal of the Spanish troops from Italy (August, 1746). Soon afterward negotiations were opened for peace with England; and these, though frequently interrupted, ultimately resulted in the treaty of Aix-la-Chapelle, which terminated the war of the Spanish succession, thus restoring peace to Europe (October, 1748). Weak in health and despondent in temperament, Ferdinand had no inclination thenceforward to take an active part in European affairs, and the management of the public business he abandoned almost entirely to his ministers Ensenada, Carvajal, and Wall. These, however, always found it necessary to take into their councils the queen, to whom



Ferdinand was much attached, the royal confessor Rabago, and the singer Farinelli, whose musical powers had given him extraordinary influence. During this reign the condition of Spanish finance was much improved; agriculture, commerce, and the arts were encouraged; by a concordat with Pope Benedict XIV., in 1753, many abuses of ecclesiastical patronage were reformed; nor were the affairs of the army and navy neglected. On the outbreak of the Seven Years' War in 1756, Spain steadfastly maintained a strict neutrality, notwithstanding the repeated efforts both of France and of England to secure her intervention, the former offering Minorca, and the latter Gibraltar as the price of her assistance. On the death of his consort in 1758, Ferdinand fell into a profound melancholy, which issued in a confirmed insanity, under which he died at Villaviciosa on August 10, 1759. Leaving no issue, he was succeeded, in terms of the treaty of Aix-la-Chapelle, by his half-brother Charles III.

FERDINAND VII., King of Spain, the eldest son of Charles IV. and of Maria Louisa of Parma, was born at San Ildefonso, October 14, 1784, and became Prince of the Asturias on the accession of his father in 1788. The year of his birth had also been the year of Godoy's arrival at court (see ALCUDIA); and the sinister influences of the royal favorite soon began to manifest themselves there. Ferdinand from a very early age learned to dislike Godoy, and he found many to sympathize with him in his not unnatural aversion. In 1802 he was married to Maria Antonietta, daughter of the King of Naples, and she, along with his former tutor, Escoiquiz, the Dukes of San Carlos, del Infantado, and others, fostered in him the spirit of resistance to the ascendancy of "the Prince of the Peace." Soon after her death in 1806 (attributed by him, though without sufficient evidence, to foul play), and the forcible removal of Escoiquiz, the court became openly divided into two hostile factions; but though Godoy had the entire confidence of the king and queen, Ferdinand had the almost undivided sympathies of the people. On October 30, 1807, he was suddenly laid under arrest on a charge of conspiracy against the crown and life of his father; but no documentary evidence against him could be produced, except a draft memorial, apparently intended for presentation to the king, in which the conduct of Godoy was bitterly complained of, and a letter to Napoleon appealing for protection, and expressing a desire to enter into a matrimonial connection with the Bonaparte family. When it was found that the French ambassador had been cognizant of these intrigues, the matter was hushed up and Ferdinand pardoned; but meanwhile the rapid movement of events, political and military, had begun to make Godoy's position an extremely precarious one. Ostensibly following out the terms of the agreement at Fontainebleau of October 27, 1807, Napoleon had not only invaded Portugal, but had also begun to pour troops into Spain (December, 1807). The Spanish people were beginning to show signs of restiveness, and, dreading an outbreak, Godoy had advised the withdrawal of the king and queen to Seville, with a view to the possible necessity for a further flight to Mexico. But before this project could be carried out the revolutionary rising at Aranjuez had taken place (March 17-18, 1808), which resulted in the forced abdication of Charles, the final overthrow of Godoy, and the enthusiastic proclamation of Ferdinand as king (March 19th). This last proceeding had been no part of Napoleon's plan; and Madrid was occupied four days afterward by the French troops under Murat. By the representations of the latter, both Charles and

his arbitration their rival claims. The result was the treaty of Bayonne between Charles and Napoleon (May 5, 1808), by which the former finally renounced the Spanish throne. Next day Ferdinand also was compelled to give up his claims; it was declared that the Bourbons had ceased to reign in Spain; and shortly afterward Joseph Bonaparte was proclaimed king. Ferdinand was now interned at Valençay (Indre), where he remained during the whole of the Spanish war of independence, receiving from Napoleon an annual allowance of 600,000 francs. The letters he wrote to Napoleon from his captivity were certainly far from indicating patriotism: most people will doubt whether they were consistent with any self-respect. He had nothing but compliments to offer on the accession of Joseph; he assured his master of his ardent prayers for his prosperity, and of his most respectful and absolute attachment to his august person; he wrote to public men to say, "My highest desire is to prove myself to be the emperor's adopted son, by my entire submission and obedience to his wishes and desires."

The decisive victory of Wellington at Vittoria (June 21, 1813), followed up by the invasion of France, induced Napoleon to treat with his captive on terms more nearly approaching those of equality (November, 1813), and ultimately the title of Ferdinand and his dynasty to the throne of Spain was recognized on his agreeing to sign a convention in which it was undertaken, on his part, to expel the English from the Peninsula, to pardon all those who had given their obedience to Joseph Bonaparte, and to restore the harmonious relations of the two kingdoms as these had subsisted prior to 1792. On his return to Spain in March, 1814, the cortes declined to recognize him until he should have sworn to the constitution which had been promulgated at Cadiz in 1812; but, listening to the counsels of the "servile" party, he first evaded and afterward rejected this demand. On May 4th he, by the decree of Valencia, annulled the constitution of 1812 and all enactments made by the cortes in his absence; on the 30th of the same month he issued his decree of proscription and perpetual exile against the *afrancesados* or those who had given obedience to Joseph Bonaparte; on July 21st he reëstablished the Inquisition, with all the powers it had possessed under Torquemada, and began a hot crusade against "liberalism" or "constitutionalism," in which no weapon of confiscation, or imprisonment, or banishment, or execution, which despotism could wield was left unemployed. This policy of the absolutist "camarilla" was for some time interrupted by a revolutionary party headed by Quiroga and Riego at Cabezas de San Juan near Cadiz, which, on January 1, 1820, caused the constitution of 1812 to be again proclaimed. The insurrection gaining daily in strength, the king was compelled to make concession after concession, until at length on March 9th, he solemnly professed his entire acceptance of the popular constitution, abolished the Inquisition, banished the Jesuits, and restored the freedom of the press. The cortes reassembled, and the citizens who had been banished reappeared. But very soon the king began to show how insincere his submission had been. Sometimes secretly, sometimes openly, he did all in his power to encourage the opposition, until, at last, in July, 1822, the royal guard broke out into open revolt with cries for "the absolute king." For the time they were repressed by the constitutionalists; but meanwhile the state of the Peninsula had attracted the attention of the Holy Alliance, and at the congress of Verona (August 25 to December 14, 1822) it was agreed to send a French army into Spain, "to deliver Ferdinand from slavery."

Madrid was entered on May 23, 1833; the cortes



withdrew to Seville, where Ferdinand was declared incapable of governing, and a regency was appointed (June 11th). Driven by the invaders to Cadiz, and there compelled to surrender, the cortes yielded up their authority into the hands of Ferdinand, who in his turn promised a general amnesty to all who had been concerned in the revolutionary proceedings. This promise he broke the very next day, annulling every act of his government since March 7, 1820. Another period of proscriptions, banishments, and fusillades now set in. Enactments of the most tyrannical description were unscrupulously made with the avowed purpose of stamping out the last spark of constitutionalism. Numbers were put to death for the most trivial offenses, and it has been estimated that some 20,000 families were compelled to leave their country. Louis XVIII. offered counsels of moderation; he reminded Ferdinand that "Christian princes ought not to rule by means of proscriptions," and that "a blind despotism, far from consolidating the power of sovereigns, weakened it;" but his remonstrances were in vain. His successor, Charles X., used similar language; but Ferdinand's reply was that he was not able to control the reactionary party which had restored him to power. During the later years of his life he took little or no interest in public affairs; and the absolutists began to turn their attention to the question of the succession. A scheme was matured for inducing the king to abdicate in favor of his brother Don Carlos; but on the death of his third wife, Maria Amalia of Saxony, in May, 1829, without issue, Ferdinand filled the "apostolics" with consternation and the liberals with new hope by contracting a fourth marriage with Maria Christina of Naples (December, 1829). In March, 1830, the king decreed the abrogation of the Salic law—a measure which excited the Carlists first to intrigue and afterward to open insurrection on the birth of a daughter in October. In 1832 Ferdinand was seized with a threatening illness, and wavered from his formerly expressed will with regard to the succession; but ultimately, in June, 1833, his daughter (Isabella II.) was declared his successor, Christina was nominated as regent, and Don Carlos with many of his followers was ordered to leave the kingdom. The death of Ferdinand at Madrid, September 29, 1833, was the signal for the outbreak of a long and bloody civil war.

FERDINAND I. and II., grand-dukes of Tuscany. See MEDICI.

FERDINAND III., Grand-Duke of Tuscany, and Archduke of Austria, second son of the Emperor Leopold II., was born May 6, 1769. On his father becoming emperor in 1790, he succeeded him as grand-duke of Tuscany. Ferdinand was the first sovereign to enter into diplomatic relations with the French republic; and, although afterward compelled by England and Russia to join the coalition against France, he concluded peace with that power in 1795, and by observing a strict neutrality saved his dominions from invasion by Napoleon till 1799, when he was compelled to vacate his throne, and a provisional republican government was established at Florence. Shortly afterward the French arms suffered severe reverses in Italy, and Ferdinand was restored to his territories, but in 1801 Tuscany was converted into the kingdom of Etruria, and he was again compelled to return to Vienna. In lieu of the sovereignty of Tuscany, he obtained in 1802 the electorship of Salzburg, which he exchanged in 1805 for that of Würzburg. In 1806 he was admitted as Grand Duke of Würzburg to the confederation of the Rhine. He was restored to the throne of Tuscany after the abdication of Napoleon in 1814, but had again to vacate it for a short time in 1815, when Murat proclaimed war against Austria. The final overflow of the French supremacy at

the battle of Waterloo secured him, however, in the undisturbed possession of his kingdom during the remainder of his life. The mild and righteous rule of Ferdinand, his solicitude for the welfare of his subjects, his enlightened patronage of art and science, his encouragement of commerce, and his sympathy with freedom render him an honorable and striking exception to the generality of Italian princes. He died on June 18, 1824.

FERDINAND, Duke of Brunswick, a famous Prussian general, the fourth son of Duke Ferdinand Albert of Brunswick, was born at Brunswick, January 11, 1721. He was educated for the military profession, and having entered the Prussian service, commanded a regiment in the first and second Silesian wars. On the outbreak of the Seven Years' War he was appointed to the command of a division, and he greatly contributed to the victory of Prague in 1757. He shortly afterward received from George II. of England the supreme command of the allied forces, and for five years, by his energy, rapidity of movement, and masterly strategy, succeeded, notwithstanding the fewness of his troops and their very mixed and heterogeneous composition, in holding at bay both the large imperial army and several French armies much better organized and officered than his own. On August 1, 1759, he gained a brilliant victory over Marshall Contades at Minden. In 1766 an estrangement occurred between Ferdinand and Frederick the Great, in consequence of which he retired from the military profession, and passed the remainder of his life at his castle of Veschelde, where he occupied himself in building and other improvements, and became a patron of learning and art, and a great benefactor of the poor. He died July 3, 1792.

FERENTINO, the ancient *Ferentinum*, a town of central Italy, in the province of Rome, is situated on the Neapolitan railway about forty-five miles southeast of Rome. Population, 9,000.

FERENTO, the remains of a city of Etruria whose ancient name was *Ferentinum*.

FERGHANA, now a province of Russian Turkestan, in the valley containing the head waters of the Sir Darya or Jaxartes, lies among the western ranges of the Thian Shan mountains, which enclose it on every side except at its west extremity, where the river emerges, passing Khojend, into the plains of western Turkestan.

FERGUS FALLS, the county seat of Otter Tail county, Minn., is situated at the great rapids of the Red River of the North, two hundred and fifteen miles west by south of Duluth, and has a population (1890) of 6,800. It is on the Northern Pacific and the St. Paul and Manitoba railroads, and possesses fine water power, which is utilized for flour mills, lumber mills, and other factories. There are two hotels, two public halls, three newspaper offices, five churches, three national banks, good schools, and considerable trade.

FERGUSON, ADAM, a distinguished philosopher and historian, was born June 20, 1723, in Perthshire, Scotland, of which parish his father was minister. He received the rudiments of his education at the village school of his native parish.

In 1759 Ferguson succeeded Dr. John Stewart as professor of natural philosophy in the university of Edinburgh. In 1764 he was transferred to the chair of moral philosophy, and within little more than a year after he published his *Essay on the History of Civil Society*, which was received with much approbation, and was translated into several European languages. Soon afterward he began to collect materials for a history of the Roman commonwealth. Whilst thus engaged, he was solicited by the guardians of Charles, Earl of Chester-



field, to superintend that young nobleman's education, which had been much neglected. He joined his young charge at Geneva in May, 1774, and remained with him for about a year. In his absence he had very nearly been deprived of his office in the university, the town-council having, as patrons, proposed to declare the chair vacant. In 1776 Ferguson published a pamphlet on the American revolution in opposition to Dr. Price's *Observations on the Nature of Civil Liberty*, in which he sympathized with the views of the British legislature. When the Government resolved to send out commissioners to quiet the disorders in the colonies, he was appointed secretary. They failed to accomplish the object of their mission, but the Government obtained through them fuller information regarding the state and temper of the Americans than they had previously possessed.

In 1780 Ferguson had a paralytic attack, which was one of the most remarkable on record, for, by an abstemious diet, he continued to enjoy almost uninterrupted good health for more than thirty years, while his mental powers were not impaired. In 1783 his great work, the *History of the Progress and Termination of the Roman Republic*, appeared in 3 vols. 4to; it was very popular, and went through several editions. In it Ferguson gives, in a connected and elegant form, a narration of the great facts of Roman history for a period of 500 years. He was led to undertake this work from a conviction that the history of that remarkable people during the period of their greatness was a practical illustration of those ethical and political doctrines which were the object of his peculiar study.

No longer able to undergo the fatigue of public teaching, Ferguson in 1785 resigned his chair in the university, in which he was succeeded by Dugald Stewart, then professor of mathematics. He now proceeded to revise his academic lectures, and in 1792 they were published under the title of *Principles of Moral and Political Science*.

When in his seventieth year, Ferguson, intending to prepare a new edition of his Roman history resolved to visit Italy. He visited some of the principal cities of Europe, and passed part of the winter of 1793 at Rome. He was generally well received, and was elected a member of the Academy of Sciences of Berlin, of the Etruscan Society of Antiquaries at Cortona, and of the Arcadia at Rome. From 1795 he resided successively at the old castle of Neidpath, near Peebles, at Hall-yards, on Manor water, and at St. Andrews, where he died February 22, 1816.

FERGUSON, JAMES, an eminent mechanist and astronomer, was born near Keith, in Banffshire, in 1710, of parents in very humble circumstances. He first learned to read by overhearing his father teach his elder brother, and with the help of an old woman was "able," he says in his autobiography, "to read tolerably well before his father thought of teaching him." After receiving further instruction in reading from his father, who also taught him to write, he was sent for three months to the grammar school at Keith. His taste for mechanics was about this time accidentally awakened on seeing his father making use of a lever to raise a part of the roof of his house—an exhibition of seeming strength which at first "excited his terror as well as wonder."

On discovering how the seeming wonder was effected, he began experiments with the view of improving on the simple lever his father had made use of; and although he soon learned that all his inventions had been anticipated, he was so well pleased to find his principles confirmed that his passion for the study of mechanics was increased rather than diminished. As soon as his age permitted he was sent to a neighboring farm to keep

sheep, where in the day time he amused himself by making models of mills and other machines, and at night in studying the stars. Afterward, as a servant with a miller, and then with a doctor, he met with hardships which rendered his constitution feeble through life. Being compelled by his weak health to return home, he there amused himself with making a wooden clock. When slightly recovered he showed this and some other inventions to a neighboring gentleman, who engaged him to clean his clocks, and also desired him to make his house his home. He there, at the suggestion of a lady visitor, commenced to draw patterns for needle work, and his success in this art led him to think of becoming a painter. Through the assistance of the same lady he was at length sent to Edinburgh, where, having obtained some instruction in drawing, he began to take portraits in miniature, by which means, while engaged in his scientific studies, he supported himself and his family for many years. On account of the success of his *Astronomical Rotula*, he determined in 1743, to leave Edinburgh for London, where he published some curious astronomical tables and calculations, and afterward gave public lectures on experimental philosophy. These he repeated in most of the principal towns in England. In 1763, he was elected a fellow of the Royal Society, and in 1770, a member of the American Philosophical Society. He died in London, November 17, 1776.

FERGUSON, ROBERT, one of the minor poets of Scotland, owes his chief fame to the fact that he was, in a very special sense, the precursor of Burns. He was the youngest of three sons of William Fergusson, a man of superior intelligence, who removed from Aberdeen to Edinburgh in 1746, and there ultimately found employment with the British Linen Company as accountant.

After a brief sojourn with a maternal uncle at Aberdeen, Fergusson returned to Edinburgh, and ere long obtained employment as copying clerk in a lawyer's office. In this humble occupation he passed the remainder of his brief life, relieving the irksome drudgery by political composition, and by evenings passed in the convivial gatherings which then formed a peculiar feature of the social life of Edinburgh. He was a member of one of its most noted clubs, celebrated by him in his poem of *Auld Reekie*. "The Knights of the Cape," as they dubbed themselves, were wont to assemble at a tavern in Craig's Close, in the vicinity of the Cross; each member had a name and character assigned to him, which he was required to maintain at all gatherings of the order. David Herd, the editor of what Scott styled the first classic edition of Scottish song, was sovereign of the Cape when Fergusson was dubbed a knight of the order, with the title of *Sir Precentor* in allusion to his fine voice. Alexander Runciman, the historical painter, his pupil Jacob More, and Sir Henry Raeburn were all members. The old minute books of the club abound with penciled sketches by them, one of the most interesting of which, ascribed to Runciman's pencil, is a sketch of Fergusson in his character of *Sir Precentor*.

In the case of Fergusson, as in that of Burns, critical censors have been too apt to ascribe to them excesses of a wholly exceptional nature; whereas they only conformed to the habits of society at a time when clergymen, judges, and men of all ranks habitually frequented the tavern, and sought intellectual as well as social pleasures in convivial clubs. In such assemblies Fergusson appears to have been the life of the company. In a letter addressed to Burns, Mr. Peter Stuart, then editor of the *Morning Post*, refers to Fergusson as his "inestimable friend," and bears testimony to the fascinating social attractions of his society. "There was," he says, "such a richness of conversation, such a plenti-



tude of fancy. . . . His manner was so felicitous, that he enraptured every person around him, and infused into the hearts of the young and old the spirit and animation which operated on his own mind."

From time to time Fergusson contributed to Ruddiman's *Weekly Magazine* grave and humorous pieces, both in English and in the Scottish dialect; but in 1773, when he was in his twenty-fourth year, his poems were collected and published in a volume. The event is not without its significance in English literature. Robert Burns was then in his fifteenth year. The volume ere long came under his notice, and the generous poet made no stinted acknowledgment of all that he owed to his predecessor. But ere such appreciative recognition could be rendered, the unhappy author had died in a maniac's cell. A fall, by which his head was severely injured, greatly aggravated symptoms of mental aberration, from which he had seemed to be recovering; and after about two months' confinement in the old Darien House—then the only public asylum in Edinburgh—the poet died on October 16, 1774, within one day of completing his twenty-fourth year.

FERGUSSON, SIR WILLIAM (1808-1877), Baronet, an eminent surgeon, the son of James Fergusson of Lochmaben, Dumfriesshire, was born at Prestonpans, East Lothian, Scotland, on March 20, 1808. In 1840 he was appointed professor of surgery in King's College, London, and surgeon to King's College Hospital. At first he acquired a practice in London only slowly, but after the deaths of the two Coopers and of Liston he soon held an unrivaled position in his own department. In 1849 he was appointed surgeon-in-ordinary to the Prince Consort, in 1855 surgeon-extraordinary to the Queen, and in 1856 sergeant-surgeon to the Queen. He was a fellow of the Royal Societies of Edinburgh and London, and of various medical societies. In 1865 he was created a baronet. He died at his Scottish residence in Peeblesshire, February 10, 1877.

FERID-EDDIN-ATHAR, or FARID UDDIN ATTAR, a Persian poet and mystic, was born at Kedken, near Nishapur, 513 A. H. (1119 A. D.), and was put to death 627 A. H. (1229 A. D.), having reached the age of 110 years.

FERISHTA, MOHAMMED KASIM, a celebrated Persian historian, was born about 1570, at Astrabad, on the shores of the Caspian Sea. While he was still a child his father was summoned away from his native country into Hindustan, where he held high office in the Deccan; and by his influence the young Ferishta received court promotion. In 1589 Ferishta removed to Bejapore, where he spent the remainder of his life under the immediate protection of the Shah Ibrahim Adil II., who engaged him to write a history of India. At the court of this monarch he died about 1611.

FERMANAGH, an inland county in the province of Ulster, Ireland, is bounded on the northwest by Donegal, on the northeast by Tyrone, on the east by Monaghan, and on the southwest by Cavan and Leitrim. Its greatest length northwest and southeast is forty-five miles; its greatest breadth northeast and southwest is twenty-nine miles. The area extends to 457,369 statute acres, or 714½ square miles, of which 106,530 acres are under tillage, 243,251 in pasture, 5,909 in plantations, 55,248 in waste bog, mountain, etc., and 46,431 under water.

The chief town in Fermanagh is Enniskillen, population (1889), 6,000. The only other towns of any importance are—Lisnaskea (857), Irvinestown, formerly Lowtherstown (787), Maguire's Bridge (685), Tempo (460), Newtownbutler (418), Brookborough (390), Rosslea (371), Ederney (332), Belleek (327), Derrygonnelly (302), Kesh (296), in all of which fairs are held and postoffices established. The Irish Northwestern divi-

sion of the Great Northern railway passes through the most populous portion of the county, one branch connecting Enniskillen with Londonderry, via Omagh, and a third connecting Enniskillen with Bundoran.

Fermanagh is situated mostly in the basin of the Erne, which divides the county into two nearly equal sections. It presents a hilly, and in many parts a somewhat sterile, appearance, though in the main, and especially in the neighborhood of Lough Erne, it is picturesque and attractive. The climate, though moist, is healthy. The chief mountains are Cuilcagh (partly in Leitrim and Cavan), 2,188 feet high; Belmore, 1,312 feet; Glenkeel, 1,223; North Shean, 1,135; Tappahan, 1,110; Carnmore, 1,034. But the most distinguishing feature of Fermanagh consists of the great extent of its surface being occupied by the Upper and Lower Loughs Erne, which stretch for forty-five miles from southeast to northwest. These lakes are formed by the expansion of the river Erne, which enters the county from Cavan at Wattle Bridge, and spreads out its waters in the Upper Lough, broken by innumerable islets. Contracting itself again, the river flows in a meandering course to the town of Enniskillen, where it expands itself once more in the Lower Lough, which extends in a northwest direction for about twenty miles, till the river again issues from it a mile above Belleek. Of the two loughs the lower and larger one is the most famed for its picturesque scenery. Both are dotted with many islands, the number of which has been stated at 199.

With the exception of the pottery works at Belleek, Fermanagh cannot boast of any distinguishing manufactures. It is chiefly an agricultural county. Of the arable land about one-half is devoted to pasturage. Oats and potatoes are the crops most extensively cultivated. The next in order are flax, turnips, wheat, barley, rye, beans, and peas.

Fermanagh returns three members to parliament—two for the county, and one for the borough of Enniskillen. The assizes are held at Enniskillen, quarter sessions at Enniskillen and Newtownbutler, and petty sessions at eleven places throughout the county. Fermanagh is within the Belfast military district. The barrack stations are at Enniskillen and Belleek. Ecclesiastically it belongs for the most part to the diocese of Clogher. The county jail and the county infirmary are at Enniskillen; but the district lunatic asylum is at Omagh (in Tyrone), serving for two counties, Fermanagh and Tyrone. The poor law union workhouses for the county are located at Enniskillen, Irvinestown, and Lisnaskea.

The population of Fermanagh steadily increased up to the year 1841. The famine and subsequent emigration intervening between that year and the next parliamentary census (1851), the population showed a decrease at the latter date of about 25 per cent., and since 1851 the decrease has continued. The exact decrease during the thirty years, 1841 to 1871, was 40.69 per cent. In 1841 the population was 156,481; in 1851, 116,047; in 1861, 105,768; in 1871, 92,794; and at the close of 1888, it had fallen to 84,789.

FERMAT, PIERRE DE (1601-1665), a famous mathematician, was born at Beaumont-de-Lomagne near Montauban. While still young he, along with Pascal, made some discoveries in regard to the properties of numbers, on which he afterward built his method of calculating probabilities. He discovered a simpler method of quadrating parabolas than that of Archimedes, and a method of finding the greatest and smallest ordinates of crooked lines analogous to that of the then unknown differential calculus. Fermat died at Toulouse.

FERMENTATION, a chemical term, which, in



accordance with its derivation from *fervere* (to boil), was originally applied indiscriminately to all chemical changes involving the effervescence of a liquid, but which, in its modern acceptation, has in itself nothing at all to do with effervescence, being used to designate a peculiar class of metamorphoses which certain complex organic materials are liable to, and of which the well-known change which grape juice undergoes when it "ferments" into wine, the souring of wine or milk, and the putrefaction of animal or vegetable matter may be cited as familiar examples.

FERMO, the ancient *Firmum Picenum*, an archiepiscopal city of central Italy, and the chief town of a circle in the province of Ascoli Piceno, thirty-four miles south by east of Ancona.

FERMOY, a market-town of Ireland, in the East Riding of the county of Cork, is about twenty-one miles distant from Cork, and about 130 miles from Dublin, and is connected with both these cities by the Fermoy branch of the Great Southern & Western Railway.

FERNAN CABALLERO. See FABER, CECILIA BÖHL VON.

FERNANDEZ, ALVARO, one of the numerous band of Portuguese explorers who, in the earlier part of the fifteenth century, took part in the search for a sea-passage into the Indian Ocean, was born about the year 1420, and seems to have been brought up as page or esquire to Prince Enrique of Portugal. He was related to Joam Gonsalvez, discoverer of Madeira and governor of Funchal. While still a comparatively young man, he was commissioned to prosecute the exploration of the African coast. After visiting the mouth of the Senegal and landing on the island of Gorée, he succeeded in reaching Cape de Matos or Mastos, the most southerly point that had ever been attained (1446). Soon afterward he took command of a second expedition, in which the utmost limit reached was Rio Tabite, a little to the south of Rio Grande. Ill health thereafter compelled his return to Portugal, where he was welcomed at court as a distinguished discoverer.

FERNANDEZ, DIEGO, a Spanish adventurer and historian of the sixteenth century. He was originally educated for the church, but about 1545 he embarked for Peru, where he served in the royal army under Alonzo de Alvarado. Mendosa, Marquis of Cañete, who succeeded Alvarado as viceroy, bestowed on Fernandez the office of chronicler of Peru; and in this capacity he wrote a narrative of the insurrection of Giron, of the rebellion of Gonzalo Pizarro, and of the administration of Gasca. The whole work, under the title *Historia del Peru*, was published at Seville in 1571.

FERNANDEZ, JOAM, a Portuguese traveler of the fifteenth century. Early in life he had been taken captive by pirates of Barbary. While amongst them he acquired a knowledge of Arabic, and had his curiosity stimulated with regard to the geography of the African continent. On regaining his freedom he joined an exploring expedition, and got himself landed at the mouth of the Ouro river, where, exposed to considerable hardship and danger, he spent seven months of a nomadic life with some of the native tribes, and acquired a considerable amount of information about the geography of the interior (1445). Two years afterward he explored the territory in the neighborhood of Cape Blanco. He deserves some notice as having been the earliest of modern African explorers.

FERNANDEZ, JUAN, a Spanish navigator and discoverer. While navigating the coasts of South America it occurred to him that the south winds that almost constantly prevailed near the shore, and retarded the voyages between Peru and Chili, might not exist further out at sea. His idea proved to be correct, and by the help

of the trade winds and some currents at a distance from the coast he made a voyage with so great rapidity that he was apprehended on a charge of sorcery. His inquisitors, however, accepted, with a readiness far from common, his natural explanation of the seeming marvel, and he was set at liberty. During one of his voyages in 1563 Fernandez discovered the two islands which now bear his name. He was so enchanted with their beauty and fertility that he solicited the concession of them from the Spanish Government. It was granted in 1572, but a colony which he endeavored to establish at the largest of them soon broke up, leaving behind them a number of goats, the progeny of which still continue on the islands. In 1574 Fernandez discovered the islands of St. Felix and St. Ambrose, and his companions who survived him affirmed that during a voyage in 1576 in the southern ocean he came in sight of a continent, which must have been either Australia or New Zealand if the discovery is to be accepted as a fact, but more probably it was either a delusion or an invention of his followers.

FERNANDEZ, JUAN, a Spanish sailor and adventurer. In 1531 he joined the army of the celebrated Francisco Pizarro, conqueror of Peru, with a small force, but in 1533 he passed into the service of his rival Pedro de Alvarado. When the latter, however, agreed for a sum of money to cede his claims on Peru and make over his navy to Pizarro and Almagro, Fernandez necessarily returned to the service of Pizarro, who not only granted him pardon, but gave him the command of the ship. In 1538 he accompanied Antonio de Sedeño on an expedition despatched by the Spanish Government against the island of Trinidad. Instead, however, of attempting to fulfill the purpose of the expedition, they were tempted by rumors of the existence of gold to disembark on the mainland, where, after enduring great privations and hardships, both leaders died in the winter after they set out, without finding the object of their quest. The survivors, under four different leaders and decimated by hunger, fatigue, and continual combats with the natives, managed to find their way to the Spanish settlements.

FERNANDO DE NORONHA, a group of islands in the South Atlantic, about 194 miles northeast of Cape St. Roque, South America. The largest of them is about 20 miles in circumference, its surface is rugged, and it contains a number of rocky hills from 500 to 700 feet high, and a mountainous peak towering to the height of about 1,000 feet. The island is covered with wood, but on account of the irregular occurrence of rain it contains scarcely any other vegetation. It has several harbors defended by forts, and serves as a place of banishment for criminals from Brazil.

FERNANDO PO, or FERNAO DO PAO, an island on the west coast of Africa, lying in the Bight of Biafra, about twenty miles from the mainland. It is about 44 miles in length from north-northeast to south-southwest, and about 20 in breadth. The coasts are steep and rocky, and the interior is mountainous. A ridge of mountains toward the center of the island rises to the height of 8,000 feet, and is terminated at each extremity by a peaked mountain—the northern one (Ste. Isabelle) attaining a height of 10,700 feet. The southern extremity of the island is also intersected by several steep mountains, varying from 1,000 to 3,000 feet. These mountains are covered, most of them to their summits, as are the intervening valleys, with dense forests of shrubs and lofty trees of luxuriant growth.

FERNEL, JEAN FRANÇOIS, a distinguished French physician, was born at Clermont in 1497. After receiving his early education at his native town, he entered the college of Sainte-Barbe, Paris, where he so distin-



guished himself in mathematics, philosophy, and languages, that not long after obtaining his M.A. degree he was offered a professorship in the college. This offer he, however, declined, choosing in preference to become a physician. He received his doctor's degree in 1530, and was named professor of medicine in 1534. His extraordinary general erudition, and the skill and success with which he sought to revive the study of the old Greek physicians, gained for him a great reputation, and ultimately the office of physician to the court. He practiced with very great success, and at his death, in 1558, left behind him an immense fortune.

FERNOW, KARL LUDWIG, a German art-critic and archæologist, was born in Pomerania, November 19, 1763. His father was a servant in the household of the lord of Blumenhagen. At the age of twelve he became clerk to a notary, and was afterward apprenticed to a druggist. While serving his time he had the misfortune accidentally to shoot a young man who came to visit him; and although through the intercession of his master he escaped prosecution, the untoward event weighed heavily on his mind, and led him at the close of his apprenticeship to quit his native place. He obtained a situation at Lübeck, where he had leisure to cultivate his natural taste for drawing and poetry. Having formed an acquaintance with the painter Carstens, whose influence was an important stimulus and help to him, he renounced his trade of druggist, and set up as portrait-painter and drawing-master. At Ludwigslust he fell in love with a young girl, and followed her to Weimar; but failing in his suit, he went next to Jena. There he was introduced to Professor Reinhold, and in his house met the Danish poet Baggesen. The latter invited him to accompany him to Switzerland and Italy, a proposal which he eagerly accepted (1794) for the sake of the opportunity of furthering his studies in the fine arts. On Baggesen's return to Denmark, Fernow, assisted by some of his friends, visited Rome and made some stay there. He now renewed his intercourse with Carstens, who had settled at Rome, and applied himself to the study of the history and theory of the fine arts and of the Italian language and literature. Making rapid progress, he was soon qualified to give a course of lectures on archæology, which was attended by the principal artists then at Rome. Having married a Roman lady, he returned in 1802 to Germany, and was appointed in the following year professor extraordinary of Italian literature at Jena. In 1804 he accepted the post of librarian to Amelia, duchess-dowager of Weimar, which gave him the leisure he desired for the purpose of turning to account the literary and archæological researches in which he had engaged at Rome. His most valuable work, the *Römische Studien*, appeared in 3 vols., 1806-1808. Ferdinand died in 1808.

FERNS, a large group of cryptogamic plants forming in a wide sense a very naturally limited group. In the article BIOLOGY it has been shown that the sub-kingdom Cormophyta includes three well-marked series, *Bryophyta*, *Pteridophyta*, *Phanerogamæ*. Of the second of these, Ferns, in the most restricted acceptation of the word, are the most conspicuous representatives.

The vigorous vegetative forms which are what are familiarly understood when ferns are spoken of are only one phase of their complete life-cycle. They are the sporophores; and the reproductive bodies they bear (spores) germinate without any process of fertilization, and are therefore not to be compared with seeds. The same thing is equally true of the other members of the series *Pteridophyta*, viz., horse tail, club mosses, selaginellas, etc.

A spore on germination produces a structure which, compared with its immediate parent, is relatively very

small, and bears no resemblance to it in form or texture. It is called the prothallium; it is green and membranous, and attached to the surface of the ground by root hairs in ferns and horse tails; in adder's tongues and club mosses it is tuberous and subterranean, while in *Rhizocarpeæ* and *Selaginella* it always remains more or less included within the cavity of the parent spore. The function of the prothallium is entirely reproductive; it develops sexual orders of two kinds, archegonia and antheridia, either upon the same or different prothallia. Hence, in contradistinction to the sporophore—the function of which in this group of plants is purely vegetative—the prothallial generation is termed the oophore.

FEROSEPORE. See FIROZPUR.

FERRAND, ANTOINE, FRANÇOIS CLAUDE, COMTE, statesman and political writer, was born at Paris, July 4, 1751, and entered the Parliament de Paris at the early age of eighteen as "conseiller aux enquêtes." During the Revolution he belonged to the emigrant party, and from 1794 to 1801 led a quiet life at Ratisbon, employing himself in literary work. In 1814 Ferrand was made minister of state and directeur général des postes. It was he who, as ministre du roi, countersigned the act of sequestration of Napoleon's property, and who, in introducing a bill for the restoration of the property of emigrants, established a distinction, since become famous, between royalists of "la ligne droite" and those of "la ligne courbe." At the second restoration, Ferrand became again directeur général des postes. He was also made a peer of France, member of the privy council, grand-officier and secretary of the orders of Saint Michel and Saint Esprit, and in 1816 member of the Academy. In his old age he became blind and enfeebled. He died January 17, 1825.

FERRARA, a city of Italy, at the head of a circondario and province of the same name, is situated in a flat alluvial district at the junction of the Po di Volano with several minor branches of the complex water-system of lower Lombardy. At the times of greatest inundation the river rises about seven or eight feet above the level of the castle court, but the statement that it sometimes even reaches above the level of the roofs is an exaggeration, and the city affords an asylum to the people of the surrounding country when the district is under water. The distance from Bologna by rail is about twenty-nine miles, and from Venice seventy. As it long occupied an important strategical position as a frontier post of the papal states, Ferrara is strongly fortified by walls, bastions, ditches, and a pentagonal citadel. Within the circuit of its defenses, which extend for nearly five miles, a large part of the area is unoccupied. In the very center of the city stands the old ducal castle or palace, surrounded by a moat, and crowned with heavy machicolations and battlements. During the papal period it was the residence of the legate, and it is now the seat of the local authorities. Population (1890), 36,000.

FERRARI GAUDENZIO (1484-1549), a painter of the Milanese, or more strictly the Piedmontese school, was born at Valduggia, Piedmont, and learned the elements of painting at Vercelli from Girolamo Giovannone. He next studied in Milan, in the school of Scotto, and some say of Luni; toward 1504 he proceeded to Florence, and afterward to Rome. His pictorial style may be considered as derived mainly from the old Milanese school, with a considerable tinge of the influence of Da Vinci, and later on of Raphael; in his personal manner there was something of the demonstrative and fantastic. The gentler qualities diminished, and the stronger intensified, as he progressed. Ferrari was again in Rome toward the close of Raphael's life, and is believed to have aided him in the works of Torre Borgia. By 1524 he was at Varallo in Piedmont, and here, in the chapel



of the Sacro Monte, the sanctuary of the Piedmontese pilgrims, he executed his most memorable work. This is a fresco of the Crucifixion, with a multitude of figures, no less than twenty-six of them being modeled in actual relief, and colored; on the vaulted ceiling are eighteen lamenting angels, powerful in expression. Other leading examples are the following. In the Royal Gallery, Turin, a *Pietà*, an able early work. In the Brera Gallery, Milan, *St. Katharine miraculously preserved from the Torture of the Wheel*, a very characteristic example, hard and forcible in color, thronged in composition, turbulent in emotion; also several frescoes, chiefly from the Church of Santa Maria della Pace, three of them being from the history of Joachim and Anna. In the Cathedral of Vercelli, the choir, the Virgin with Angels and Saints under an Orange-tree. In the refectory of San Paolo, the Last Supper. In the Louvre, St. Paul Meditating. In Varallo, convent of the Minorities (1507), a Presentation in the Temple, and Christ among the Doctors; and (after 1510) the History of Christ, in twenty-one subjects; also an ancona in six compartments, named the Ancona di San Gaudenzio. In Santa Maria di Loreto, near Varallo (after 1527), an Adoration. In the Church of San Cristoforo, the transept (in 1532-35), a series of paintings in which Ferrari's scholar Lanini assisted him; by Ferrari himself are the Birth of the Virgin, the Annunciation, the Visitation, the Adoration of the Shepherds and Kings, the Crucifixion, the Assumption of the Virgin, all full of life and decided character, though somewhat mannered. In the Church of Saronno, near Milan, the cupola (1535), a Glory of Angels, in which the beauty of the school of Da Vinci alternates with bravura of foreshortenings in the mode of Correggio. In Milan, Santa Maria delle Grazie (1542), the Scourging of Christ, an Ecce Homo, and a Crucifixion. The Scourging, or else a Last Supper, in the Passione of Milan, is regarded as Ferrari's latest work. He was a very prolific painter, distinguished by strong expression, animation and fullness of composition, and abundant invention; he was skillful in painting horses, and his decisive rather hard color is marked by a partiality for shot tints in drapery. In general character, his work appertains more to the fifteenth than the sixteenth century. His subjects were always of the sacred order. Ferrari's death took place in Milan.

FERREIRA, ANTONIO (1528-1569), Portuguese poet, was born at Lisbon in 1528. He was of a noble family, and completed his education at the University of Coimbra. His chief dramatic work is the tragedy of *Inez de Castro*, the first Portuguese tragedy, and the second in modern European literature, the only one of earlier date being the Italian tragedy of *Sofonisba* by Trissino. Ferreira's elegies are numerous, but few of them bear the impress of sincerity of feeling. One of the most admired is that on *May* and the return of spring. The *Epistles* of Ferreira, forming the largest portion of his works, were the first of their kind in Portuguese literature. They were addressed to many illustrious persons during his residence at court, in the maturity of his powers and knowledge of the world. Usually didactic and serious in tone, studious of correctness and classical elegance of form, the poetry of Ferreira lacked the inspiration of genuine passion and the power to touch the hearts of his countrymen. It never became popular. He was looked up to, however, as an oracle by the critics of his own day, enjoyed the special favor of King John III. and two of his successors, and had reason to hope for a long and honorable career. But he was carried off suddenly in the prime of life, by the plague which raged in 1569.

FERRET (*Mustela furo*), an albino variety of weasel,

regarded by some as the descendant of a wild species originally brought from Africa, and now only known in the domesticated state, and by others, as a variety of the polecat (*Mustela putorius*), which it closely resembles in size, form, and habits, and with which it is said to interbreed freely. It differs, however, from the polecat in the color of its fur, which is usually yellowish-white, and of its eyes, which are pinky-red.

FERRI, CIRO (1634-1689), a Roman painter, the chief disciple and successor of Pietro de Cortona. He was born in the Roman territory, studied under Pietro, to whom he became warmly attached, and, at an age a little past thirty, completed the painting of the ceilings and other internal decorations begun by his instructor in the Pitti Palace, Florence. He also coöperated in or finished several other works by Pietro, both in Florence and in Rome, approaching near to his style and his particular merits, but with less grace of design and native vigor, and in especial falling short of him in color. Of his own independent productions, the chief is an extensive series of scriptural frescoes in the church of St. Maria Maggiore in Bergamo; also a painting of St. Ambrose, the principal altarpiece in the Church of St. Ambrogio della Massima in Rome. The paintings of the cupola of St. Agnese in the same capital might rank even higher than these, but this labor remained uncompleted at the death of Ferri, and was marred by the performances of his successor, Corbellini. He executed also a large amount of miscellaneous designs, such as etchings and frontispieces for books, and he was an architect besides. Ferri was appointed to direct the Florentine students in Rome, and Gabbiani was one of his leading pupils. As regards style, Ferri ranks as chief of the so-called Machinists, as opposed to the school founded by Sacchi, and continued by Carlo Maratta. He died in Rome—his end being hastened, as it is said, by mortification at his recognized inferiority to Bacciccia in color—in 1689.

FERRIER, JAMES FREDERICK (1808-1864), metaphysician, was born in Edinburgh on June 16, 1808. His father was a writer to the signet, and his grandfather was an intimate friend of Sir Walter Scott. His mother was sister of Prof. John Wilson. In his early youth he lived in the family of the Reverend Doctor Duncan, in the manse of Ruthwell, Dumfriesshire, and under Doctor Duncan's tuition he acquired a strong liking for the Latin poets, which remained with him all his days. In 1842 he was appointed professor of civil history in Edinburgh University. In session 1844-45 he acted as Sir William Hamilton's substitute in the chair of logic and metaphysics, and in 1845 he was elected professor of moral philosophy and political economy at St. Andrews. He was twice an unsuccessful candidate for chairs in Edinburgh, for that of moral philosophy on the resignation of Professor Wilson in 1852, and for that of logic and metaphysics in 1856, after Hamilton's death. As a professor Ferrier had immense influence over his students, and was warmly beloved by them. He had an attack of *angina pectoris* in November, 1861, from the effects of which he never recovered. He died on June 11, 1864.

FERRIER, SUSAN EDMONSTON, Scottish novelist, born in Edinburgh in 1782, was the aunt of the subject of last notice. Her father was James Ferrier, for some years factor to the Duke of Argyll, and at one time one of the clerks of the Court of Session with Sir Walter Scott. Her mother was a Miss Coutts, the beautiful daughter of a Forfarshire farmer. Miss Ferrier's first novel, *Marriage*, was begun in concert with a friend, Miss Clavering, granddaughter of the Duke of Argyll; but this lady soon relinquished her share in the work, and *Marriage*, completed by Miss Ferrier alone, appeared in 1818, when its authoress was between five and six and thirty. It was followed in 1824 by *The*



*Inheritance*, a better constructed and more mature work; and the last and perhaps best of her novels, *Destiny*, dedicated to Sir Walter Scott (who himself undertook to strike the bargain with the publisher, Cadell), appeared in 1831. All these novels were published anonymously; but, with their clever portraiture of contemporary Scottish life and manners, and even recognizable caricatures of some social celebrities of the day, they could not fail to become popular north of the Tweed, and many were the conjectures as to their authorship, which was by some attributed to Scott himself. Thus, in the *Noctes Ambrosianæ* (November, 1826), the Shepherd mentions *The Inheritance*, and adds, "which I aye thought was written by Sir Walter, as weel's *Marriage*, till it spunked out that it was written by a leddy." Scott himself gave Miss Ferrier a very high place indeed among the novelists of the day. In his diary (March 27, 1826), criticizing a new work which he had been reading, he says, "The women do this better. Edgeworth, Ferrier, Austen, have all given portraits of real society far superior to anything man, vain man, has produced of the like nature." Another friendly recognition of Miss Ferrier is to be found at the conclusion of his *Tales of my Landlord*, where Scott calls her his "sister shadow," the still anonymous author of "the very lively work entitled *Marriage*." Miss Ferrier lived till 1854, more than twenty years after the publication of her last work.

FERRO, or HIERRO. See CANARY ISLANDS.

FERROL, a seaport town of Spain, province of Coruña, is situated on the northern arm of the Bay of Belanzos, twelve miles northeast of Coruña.

FERRY, in law, is the right of carrying by boat across a river or arm of the sea, and of exacting a reasonable toll for such carriage. It belongs, like the right of fair and market, to the class of rights called franchises. Its origin must be by statute, grant, or prescription. It is wholly unconnected with the ownership or occupation of land, so that the owner of the ferry need not be proprietor of the soil on either side of the water over which the right is exercised. He is bound to maintain safe and suitable boats ready for the use of the public, and to employ fit persons as ferrymen. As a correlative of this duty he has a right of action, not only against those who evade or refuse payment of toll when it is due, but against those who disturb his franchise by setting up a new ferry, so as to diminish his custom.

FERSEN, AXEL, COUNT, marshal of the kingdom of Sweden, was born at Stockholm, September 4, 1755. When the flight of Louis XVI. and his family was projected Count Fersen consented to play the part of a coachman in disguise; and he conducted them to the post of Bondi. After the failure of the scheme and the imprisonment of the royal family, he zealously exerted himself to minister in any way possible to their comfort and relief. Compelled to leave France after the execution of the king and queen, he visited Vienna, Dresden, and Berlin, and then returned to Sweden. He was named by the king grand-master of his household, chancellor of the university of Upsala, and marshal of the kingdom. He was soon after sent as plenipotentiary to the congress of Rastadt. But he was at the same time disliked and suspected by the people; and when the crown prince, Christian of Augustenburg, suddenly died, in June, 1810, suspicions fastened on him and his sister the Countess Piper, of having taken part with others in poisoning the prince. At the funeral they were assailed by the crowd; the marshal sought refuge in a house, but was slain by the mob, and his body exposed in the great square (June 20, 1810). His sister succeeded in making her escape. The complete innocence of Count Fersen and his

family was established by a subsequent judicial investigation.

FESCA, FREDERICK ERNEST, violinist and composer of instrumental music, was born February 15, 1789, at Magdeburg, where he received his early musical education from Lohse and Zachariä. In 1808 he was appointed solo-violinist by King Jerome of Westphalia at Cassel, and there he remained till the end of the French occupation (1814), when he went to Vienna, and soon afterward to Carlsruhe, having been appointed concert-master to the Grand Duke of Baden. His failing health prevented him from enjoying the numerous and well-deserved triumphs he owed to his art, and in 1826 he died of consumption at the early age of thirty-seven. As a virtuoso Fesca is amongst the best masters of the German school of violinists, the school subsequently of Spohr and of Joachim.

FESCH, JOSEPH, cardinal, archbishop of Lyons, was born at Ajaccio, in Corsica, January 3, 1763, six years before the island was conquered by the French. His father, Francis Fesch, of Basel, was a Swiss officer in the service of Genoa, who had married as his second wife a young widow, the mother of Letizia Bonaparte. Joseph Fesch was thus half-brother to Letizia and uncle to her son Napoleon Bonaparte. He was educated at the seminary of Aix in Provence, took holy orders, and became arch-deacon and provost of the chapter of Ajaccio. When the French Revolution broke out, and the chapters were suppressed, Fesch protested against the civil constitution of the clergy, and laid aside his clerical dress. In 1793 he had to quit Corsica, followed the Bonapartes to Toulon, and obtained a post in the army administration. In 1795 he was named commissary of war in the army of Italy, of which his nephew Napoleon Bonaparte became commander-in-chief. After the 18th Brumaire (November 9, 1799,) he resumed his ecclesiastical functions, and took part in the negotiations which led up to the concordat of 1801. In the following year he was consecrated archbishop of Lyons, and early in 1803 received a cardinal's hat. Napoleon having been proclaimed emperor, and desiring to be crowned at Paris by the pope, Cardinal Fesch was sent as ambassador to Rome to treat with Pius VII. respecting this project. He was received with much distinction, won the pope's good opinion, and brought the negotiations to a successful issue. On this occasion the cardinal had for his secretary the Viscount de Châteaubriand, who had just made himself famous by the publication of his *Génie du Christianisme*. The association, however, was not a happy one. Cardinal Fesch accompanied Pius VII. to Paris, and took part in all the ceremonies of the coronation of his nephew. In reward for his services at Rome he was made grand-almoner of France, grand-cordon of the Legion of Honor, and senator. In 1806 he was chosen coadjutor and successor of Dalberg, prince-primate of the confederation of the Rhine, and arch-chancellor of the empire, and received a large annual subvention. The dissensions which continued between Napoleon and the holy see made the cardinal's position a very difficult one; but he resisted the violent measures taken by the emperor against the pope; and when, in 1809, the emperor desired to have one of his kindred head of the French church, and offered to Fesch the archbishopric of Paris, he declined the offer. He refused even to accept the administration of the diocese. As president of the national ecclesiastical council held at Paris in 1810, he boldly put forward views which gave offense to the emperor and lost him his favor. He was sent back to his diocese, and in consequence of his letter to the pope, then at Fontainebleau, he was deprived of his subvention. In 1814 he withdrew to Rome, but re-



turned to France and his see during the Hundred Days. He was created a peer, but never sat in the chamber. After Waterloo he returned to Rome, and there spent the remaining years of his life in the enjoyment of his vast wealth and his accumulated art-treasures. He died at Rome, May 13, 1839. His correspondence with Napoleon was published by Du Casse in 1855.

FESSLER, IGNAZ AURELIUS, a celebrated Hungarian ecclesiastic, historian, and freemason, was born on May 18, 1756, at the village of Zurány, in the county of Moson. His mother, who was a pious Roman Catholic, made every effort to secure for him a strict religious education. On July 9, 1773, he joined the order of Capuchins as a novice, and in the following year he took the monastic vows, assuming the name of Innocentius. After living in disagreement with his superiors in different monasteries, he was transferred to the Capuchin house at Vienna; and while there, by means of a private letter, he drew the attention of the Emperor Joseph II. to the irregularities of the monasteries. The searching investigation which followed raised up against him many implacable enemies. Released from the monastery by an imperial degree, he was, in 1784, appointed professor of Oriental languages and hermeneutics in the university of Lemberg. In 1787 he brought out his tragedy of *Sidney*, which his enemies attacked so violently as profane and revolutionary, that they compelled him to resign his office and seek refuge in Silesia. In Breslau he met with a cordial reception from Korn, the publisher, and was, moreover, subsequently employed by the prince of Carolath as tutor to his sons. In 1791 Fessler was converted to Protestantism, and in 1796 he went to Berlin, where he founded a humanitarian society, and was commissioned by the freemasons of that city to assist Fichte in reforming the statutes and ritual of their lodge. He soon after this obtained a government appointment in connection with the newly acquired Polish provinces, but in consequence of the battle of Jena (1806) he lost this office, and remained in very needy circumstances until 1809, when he was summoned to St. Petersburg by Alexander I., to fill the post of court councilor, and the professorship of Oriental languages and philosophy, at the Alexander-Newski Academy. This office, however, he was soon obliged to resign, owing to his alleged atheistic tendencies, but he was subsequently nominated a member of the legislative commission. In 1815 he was deprived of his salary, but it was restored to him in 1817. In November, 1819, he was appointed consistorial president of the Protestant communities at Saratov, and subsequently became chief superintendent of the Lutheran communities in St. Petersburg. Fessler's numerous works are all written in German. In recognition of his important services to Hungary as a historian, he was, in 1831, elected a corresponding member of the Hungarian Academy of Sciences. He died at St. Petersburg, December 15, 1839, in the eighty-fourth year of his age.

**FESTIVALS.** A festival or feast is a day or series of days specially and publicly set apart for religious observances. Whether its occurrence be casual or periodic, whether its ritual be grave or gay, carnal as the orgies of Baal and Astarte or spiritual as the worship of a Puritan Sabbath, it is to be regarded as a festival or "holy day" as long as it is professedly held in the name of religion.

To trace the festivals of the world through all their variations would be to trace the entire history of human religion and human civilization. Where no religion is, there can of course be no feasts; and without civilization any attempt at festival-keeping must necessarily be fitful and comparatively futile. But, as religion develops, festivals develop with it, and assume their distinctive character;

and, an advancing civilization, at least in its earlier stages, will generally be found to increase their number, enrich their ritual, fix more precisely the time and order of their recurrence, and widen the area of their observance.

*Greek Festivals.*—Perhaps the annual Attic festival in honor of Erechtheus alluded to in the *Iliad* ought to be regarded as an instance of ancestor-worship; but the seasonal character of the new-moon feast in *Od.*, xx, 156, and of the harvest-festival in *Il.*, ix, 533, is generally acknowledged. The older Homeric poems, however, give no such express indications of a fully-developed system of festivals as are to be met with in the so-called "Homeric" hymns, in the *Works and Days* of Hesiod, in the pages of Herodotus, and so abundantly in most authors of the subsequent period; and it is manifest that the calendar of Homer or even of Herodotus must have been a much simpler matter than that of the Tarentines, for example, came to be, of whom we are told by Strabo that their holidays were in excess of their working days. Each demos of ancient Greece during the historical period had its own local festivals, often largely attended and splendidly solemnized, the usages of which, though essentially alike, differed very considerably in details. These details have in many cases been wholly lost, and in others have reached us only in a very fragmentary state. But with regard to the Athenian calendar, the most interesting of all, our means of information are fortunately very copious. It included some fifty or sixty days on which all business, and especially the administration of justice, was by order of the magistrates suspended.

Of these (for the more important of which reference is made to the separate articles) some are commemorative of historical events, and one at least may perhaps be regarded as a relic of ancestor-worship; but the great majority are nature-festivals, associating themselves in the manner that has already been indicated with the phenomena of the seasons, the equinoxes and the solstices. In addition to their numerous public festivals, the Greeks held various family celebrations, in connection with weddings, births, and similar domestic occurrences. The great national festivals—Olympian, Pythian, Nemean, and Isthmian—will be found under separate headings.

*Roman Festivals.*—For the purpose of holding comitia and administering justice, the days of the Roman year were regarded as being either dies fasti or dies nefasti—the dies fasti being the days on which it was lawful for the prætors to administer justice in the public courts, while on the dies nefasti neither courts of justice nor meetings of comitia were allowed to be held. Some days were fasti during one portion and nefasti during another; these were called dies intercesi. For the purposes of religion a different division of the year was made; the days were treated as festi or as profesti—the former being consecrated to acts of public worship, such as sacrifices, banquets, and games, while the latter (whether fasti or nefasti) were not specially claimed for religious purposes. The dies festi or feriæ publicæ were either stativæ, conceptivæ, or imperitivæ. The stativæ were such as were observed regularly, each on a definite day; the conceptivæ were observed annually on days fixed by the authorities for the time being; the imperitivæ were publicly appointed as occasion called for them. In the Augustan age the feriæ stativæ were very numerous, as may be seen from what we possess of the *Fasti* of Ovid. The number was somewhat fluctuating. Festivals frequently fell into desuetude or were revived, were increased or diminished, were shortened or prolonged at the will of the emperor, or under the caprice of the popular taste. Thus Augustus restored the Compitalia and Lupercalia; while Marcus Antoninus in his



turn found it expedient to diminish the number of holidays.

The calendar as it stood at the Augustan age was known to contain many comparatively recent accessions, brought in under the influence of two "closely allied powers, the foreign priest and the foreign cook" (Mommsen). The Megalesia, for example, had been introduced 204 B.C. The Ludi Apollinares could not be traced further back than 208 B.C. The Floralia and Cerealia had not come in much earlier. Among the oldest feasts were undoubtedly the Lupercalia, in honor of Lupercus, the god of fertility; the Equiria, in honor of Mars; the Palilia; the great September festival; and the Saturnalia.

Among the *feriæ conceptivæ* were the very ancient *feriæ Latinæ*, held in honor of Jupiter on the Alban Mount, and attended by all the higher magistrates and the whole body of the senate. The time of their celebration greatly depended on the state of affairs at Rome, as the consuls were not allowed to take the field until they had held the *Latinæ*, which were regarded as days of a sacred truce. The *feriæ sementivæ* were held in the spring, and the *Ambarvalia* in autumn, both in honor of Ceres. The *Paganalia* of each *pagus*, and the *Compitalia* of each *vicus* were also *conceptivæ*. Of *feriæ imperativæ*—that is to say, festivals appointed by the senate, or magistrates, or higher priests to commemorate some great event or avert some threatened disaster—the best known is the *Novendiale*, which used to be celebrated as often as stones fell from heaven. In addition to all those already mentioned, there occasionally occurred *ludi votivi*, which were celebrated in fulfillment of a vow; *ludi funebres*, sometimes given by private persons; and *ludi seculares*, to celebrate certain periods marked off in the Etrusco-Roman religion.

Of the Jewish feasts which are usually traced to a pre-Mosaic origin the most important and characteristic was the weekly Sabbath, but special importance was also attached from a very early date to the lunar periods. It is probable that other festivals also, of a seasonal character, were observed. In common with most others, the Mosaic system of annual feasts groups itself readily around the vernal and autumnal equinoxes. In Lev. xxiii, where the list is most fully given, they seem to be arranged with a conscious reference to the sacred number seven. Those belonging to the vernal equinox are three in number; a preparatory day, that of the Passover, leads up to the principal festival, that of unleavened bread, which again is followed by an after-feast, that of Pentecost (see PASSOVER, PENTECOST).

*Earlier Christian Festivals.*—While making it abundantly manifest that Christ and His disciples observed the appointed Jewish feasts, the New Testament nowhere records the formal institution of any distinctively Christian festival. But we have unambiguous evidence of the actual observance, from a very early period, of the first day of the week as a holy day. Pliny, in his letter to Trajan, describes the Christians of Bithynia as meeting for religious purposes on a set day; that this day was Sunday is put beyond all reasonable doubt by such a passage as that in the *Apology* of Justin Martyr, where he says that "on Sunday all the Christians living either in the city or the country met together."

The numerous yearly festivals of the later Christian church, when historically investigated, can be traced to very small beginnings. Indeed, while it appears to be tolerably certain that Jewish Christians for the most part retained all the festivals which had been instituted under the old dispensation, it is not at all probable that either they or their Gentile brethren recognized any yearly feasts as of distinctively Christian origin or obli-

gation. It cannot be doubted, however, that gradually, in the course of the second century, the universal church came to observe the anniversaries of the death and resurrection of Christ, as they were respectively called, (see EASTER and GOOD FRIDAY). Not long afterward Whitsunday also came to be fixed in the usage of Christendom as a great annual festival. Even Origen enumerates as Christian festivals the Sunday, the Passover with the feast of the Resurrection, and Pentecost; under which latter term, however, he includes the whole period between Easter and Whitsuntide. About Cyprian's time we find individual Christians commemorating their departed friends, and whole churches commemorating their martyrs; in particular, there are traces of a local and partial observance of the feast of the Innocents. Christmas day and Epiphany were among the later introductions, the feast of the Epiphany being somewhat the earlier of the two. (See EPIPHANY).

When we come down to the fourth century we find that, among the fifty days between Easter and Pentecost, Ascension day has come into new prominence. Augustine, for example, enumerates as anniversaries celebrated by the whole church those of Christ's passion, resurrection and ascension, along with that of the outpouring of the Holy Ghost, while he is silent with regard to Christmas and Epiphany. The general tendency of this and the following centuries was largely to increase the festivals of the church, and by legislation to make them more fixed and uniform. Many passages, indeed, could be quoted from Chrysostom, Jerome and Augustine, to show that these fathers had not by any means forgotten that comparative freedom with regard to outward observances was one of the distinctive excellencies of Christianity as contrasted with Judaism and the various heathen systems. But there were many special circumstances which seemed to the leaders of the church at that time to necessitate the permission and even legislative sanction of a large number of new feasts. The innovation of heretics sometimes seemed to call for rectification by the institution of more orthodox observances; in other instances the propensity of rude and uneducated converts from paganism to cling to the festal rites of their forefathers proved to be invincible, so that it was seen to be necessary to seek to adapt the old usages to the new worship rather than to abolish them altogether; moreover, although the empire had become Christian, it was manifestly expedient that the old holidays should be recognized as much as possible in the new arrangements of the calendar. Constantine, soon after his conversion, enacted that on the *dies dominica* there should be no suits or trials at law; Theodosius the Great added a prohibition of all public shows on that day, and Theodosius the Younger extended the prohibition to Epiphany and the anniversaries of martyrdoms, which, at that time, included the festivals of St. Stephen, and of St. Peter and St. Paul, as also that of the Maccabees. In the twenty-first canon of the council of Agde (506), besides Easter, Christmas, Epiphany, Ascension, and Pentecost, we find the Nativity of John the Baptist already mentioned as one of the more important festivals on which attendance at church was regarded as obligatory. To these were added, in the centuries immediately following, the feasts of the Annunciation, the Purification, and the Assumption of the Virgin, as well as those of the Circumcision, of St. Michael, and of All Saints.

In the present calendar of the Roman Catholic Church the number of feast days is very large. Each is celebrated by an appropriate office, which, according to its character, is either duplex, semi-duplex, or simplex. A duplex again may be either of the first class or of the second, or a major or a minor. The distinctions of



ritual for each of these are given with great minuteness in the general rubrics of the breviary; they turn chiefly on the number of Psalms to be sung and of lessons to be read, on the manner in which the antiphons are to be given, and on similar details. The duplicia of the first class are the Nativity, the Epiphany, Easter with the three preceding and two following days, the Ascension, Whitsunday and the two following days, Corpus Christi, the Nativity of St. John Baptist, Saints Peter and Paul, the Assumption of the Virgin, All Saints, and, for each church, the feast proper to its patron or title and the feast of its dedication. The duplicia of the second class are the Circumcision, the feast of the Holy Name of Jesus, of the Holy Trinity, and of the most Precious Blood of Christ, the feasts of the Purification, Annunciation, Visitation, Nativity, and Conception of the Virgin, the Natalitia of the Twelve Apostles, the feasts of the Evangelists, of St. Stephen, of the Holy Innocents, of St. Joseph and of the Patrocinium of Joseph, of St. Lawrence, of the Invention of the Cross, and of the Dedication of St. Michael. The Dominicæ majores of the first class are the first Sunday in Advent, the first in Lent, Passion Sunday, Palm Sunday, Easter Sunday, Dominica in Albis, Whitsunday, and Trinity Sunday; the Dominicæ majores of the second class are the second, third, and fourth in Advent, Septuagesima, Sexagesima, and Quinquagesima Sundays, and the second, third, and fourth Sundays in Lent.

FESTUS, SEXTUS POMPEIUS, a Latin grammarian of uncertain date, but who probably flourished in the second century of the Christian era. He wrote an epitome of the celebrated work *De Verborum Significatione*.

FETICHISM is a stage of worship, or of the ways of regarding nature (for in simple states of mind religion and philosophy are in great part merged) in which ordinary material objects are regarded as holding, or as being the vehicle of, supernatural powers and influences — which powers and influences can, it is supposed, be controlled or directed by the person possessing the object so endowed.

Religions have not, as yet, been scientifically classified in anything like a final manner. Even the most rigorous of minds would hardly assert that the time has yet arrived for such a classification. But it is possible, even now, to collect roughly those beliefs which, whether still existing among savages and uneducated people of all classes or traceable only among the records of the past, bear a general resemblance to each other, and to give a general name marking that resemblance. Such a name we have in "fetichism." The word *feitico*, corresponding to our "fetich," seems to have been first applied by Portuguese traders on the west coast of Africa to savage objects of worship, which were noticed from their resemblance to the talismans and charms common in Europe, and popular with sailors and travelers above all men.

Both natural and artificial objects are used as fetiches. To the savage nothing seems too great to serve his individual purposes, nothing too insignificant or commonplace to be the center of his ideas of power and devotion.

Generally upon beginning an expedition the negro of Guinea chooses the first object that presents itself to his eyes upon issuing forth, and vows to worship that as a god if the work in hand prove successful; if not, it is cast aside as useless or worse. Stones, trees, twigs, pieces of bark, roots, corn, claws of birds, teeth, skins, feathers, human and animal remains of all kinds — anything that may strike the savage as in any way peculiar — are used in this manner; even whole species of animals, rivers, the sea, the moon, and the sun. Articles

of costume, tools, weapons, boats, and other articles of human manufacture are not objected to.

But the belief in the efficacy of peculiar objects upon a person's welfare is not by any means confined to savages. Witchcraft is a form of fetichism, and it can hardly be said to be dead from among us even now. Others than children may be found who will keep a crooked sixpence, a curious stone, a hard potato, for luck — prompted by exactly those instincts, which, although long superceded in some races, are perhaps the highest the savage possesses. The power of the fetich seems in many cases, however, to be regarded not as superhuman, but as extra-human. The tendency to believe that what precedes, accompanies or follows a thing or accident, must be somehow causally connected with it is ever prevalent; and to palliate our wonder at the gross superstitions of the savage we must remember how many people we have met in the heart of modern civilization who are careful about lucky and unlucky days and numbers. As the fetich becomes more and more endowed with personality and will, so the belief passes imperceptibly into what is called idolatry.

FETIS, FRANÇOIS JOSEPH, although a fertile composer of almost every kind of music, will be chiefly remembered as a theoretical and critical writer. He was born at Mons, in Belgium, March 25, 1784, and was trained as a musician by his father, who followed the same calling. In 1800 he went to Paris and completed his studies at the conservatoire under such masters as Boieldieu, Rey, and Pradher. After many vicissitudes he was in 1823 appointed professor at the same celebrated institute, and remained in the French capital for ten years, till in 1833 he obtained the directorship of the music school of Brussels, which owes much to his indefatigable zeal. He also was the founder, and, till his death, the conductor of the celebrated concerts attached to the conservatoire of Brussels. Fétis died at Brussels in 1871. His valuable library was purchased by the Belgian Government and presented to the conservatoire.

FEU, in the law of Scotland, signifies, in its widest sense, any tenure of land by which the relation of superior (or overlord) and vassal is constituted.

FEUCHTERSLEBEN, EDUARD, FREIHERR VON (1806–1849), an Austrian physician, philosopher, and poet, was born at Vienna on April 29, 1806. He entered the university of Vienna in 1825, and obtained his doctor's degree in 1833. In 1845 he became dean of the faculty of medicine, and in 1847 was named vice-director of medico-chirurgical studies. In July, 1848, he was appointed under secretary of state of the education department, but resigned his office in the same year, and died September 3, 1849.

FEUDALISM, FEUDAL SYSTEM. *Feodum*, *feudum*, *fief*, or *fee* is derived from the German *Vieh*, cattle (Gothic, *faihu*; Old High German, *fihu*; Old Saxon, *fehu*; Anglo-Saxon, *feoh*); in a secondary sense the word came to denote goods, money, property in general. The second syllable has been connected with another root, *od*, also meaning property — the whole word denoting property held as a reward, or in consideration of special service. Whether this etymology be correct or not, this is the signification which the word acquired in time. "The word *feodum* is not found earlier than the close of the ninth century. But neither the etymology of the word nor the development of its several meanings can be regarded as certain."

Feudalism in a broad sense may be taken to mean a social organization based on the ownership of land, and personal relations created by the ownership of land — a state of things in which public relations are dependent on private relations, where political rights depend on landed rights, and the land is concentrated in the hands



of a few. Feudalism in this sense has existed, and perhaps may still exist, in various parts of the world; but the feudal system *par excellence* is always understood to mean that special form of feudalism which was developed on the soil of Gaul by the conquering Franks. England had a feudalism of its own, developed simultaneously but independently through the operation of similar causes. Just as the insular feudalism had reached its maturity, the continental feudalism was brought over ready-made by the Normans, and superimposed on the basis of the domestic product. Thus our social state exhibits elements derived from both forms of feudalism, in conjunction with fossil relics of still earlier institutions. Both varieties of feudalism may be regarded as transition states, intervening between the rough, wild liberty of primitive society based on individualism and the carefully organized liberty of modern society based on the effectual supremacy of the law.

Both forms of feudalism had their roots in the organization of primitive Germany. A glance at that system is desirable for a thorough comprehension of our subject; it will help us to realize what feudalism was, if not to discern how it grew up. The leading characteristics of the Teutonic polity were individual liberty and tribal autonomy. Each tribe or canton is theoretically independent, and entitled to manage its own concerns; within the tribe all free heads of houses are politically equal, and entitled to a voice in the affairs of the community. Each free villager has his share of the tribe lands—his homestead, his proportion of the arable land, with corresponding rights over the forest and pasture lands. The shares are not necessarily equal, as social distinctions exist, and are fully recognized by the law; but whether large or small, the shares are held on the like terms of participation in all public duties, chief of which are the obligations of attendance in the communal meetings and in the host. The shares so held “bore among the northern nations the name of Odal or Edhel.” Whether any etymological connection exists between the words *odal* and *alod* “may be questioned, but their signification as applied to land is the same; the *alod* is the hereditary estate derived from primitive occupation, for which the owner owes no service except the personal obligation to appear in the host and in the council.” As above intimated, political equality was not held incompatible with social inequality; the population was divided into three classes, rated at different values in the legal tariff. First came the *nobilis*, *eorl*, or *atheling*, the man distinguished by ancestral wealth and reputed purity of blood; next ranked the simple freemen, the *ingenuus*, *frilingus*, or *ceorl*; at the bottom of the social scale stood the serf or slave (*colonus lazzus*, *lat*, *servus*, *theow*). An injury done to an *eorl* or his property would cost the offender twice or three times as much as the same injury done to a *ceorl*; at an equal distance below the *ceorl* ranks the slave, but the compensation for injury done to him of course goes to his master. The official magistracy (*principes*) are selected from the ranks of the nobility; very distinguished parentage will at times entitle a mere lad to high office, but this is rare. Superior birth gives weight and precedence in the national councils; above all, where a powerful tribe or confederation of tribes think fit to exalt their dignity by conferring regal honors on their chief, care is taken to select the king from the family of noblest birth. But in critical times the instinct of a free people taught that the claims of birth must give place to more weighty considerations; whoever might be allowed to rule in time of peace, on the field of battle only the man of tried ability could take the lead. Judicial and political business was transacted in the various national assemblies held at fixed times, “gener-

ally at the new or full moon.” Local questions and matters of police were determined in the meetings of the mark or township (*vicus*, *dorff*); the higher criminal jurisdiction and questions of a political nature were reserved for the *malls* or *gemotes* of the hundred, canton, or tribe (*gau*, *pagus*, *gens*); “there was no distinction of place; all were free, all appeared in arms.” The order of business was settled beforehand by the chiefs in committee, a leading elder would open the debate; others followed as the spirit moved them; the people decided as they thought fit. “Opposition was expressed by loud shouts, assent by the striking of spears, enthusiastic applause by the clash of spear and shield.”

If we pass to the close of the tenth century, and take a survey of the social condition of western Europe, we shall find all the principles of the primitive Germanic society inverted. Political organization from being personal has become territorial; “the ideas of individual freedom and political right” have “become so much bound up with the relations created by the possession of land as to be actually subservient to them.”

Everything belongs either to the king or the lord. Thus in England the national peace is now the king’s peace; the state domain—the folkland—is *terra regis*. The township has become the lord’s manor, the township waste the lord’s waste, the township court the lord’s court. “Land has become the sacramental tie of all public relations; the poor man depends on the rich, not as his chosen patron, but as the owner of the land that he cultivates, the lord of the court to which he does suit and service, the leader whom he is bound to follow to the host. The new order of things, sprang from two great sources, the beneficiary system and the practice of ‘commendation.’ On Gallic soil it was specially fostered by the existence of a subject population, which admitted of any amount of extension in the methods of dependence.”

The system of benefices had its origin partly in grants of land made by kings and *principes* to their *comites*, kinsmen, and servants, on terms of special fidelity—analogue to, if not identical with, the bond of the *comitalus*—partly in the surrender of alodial estates made by the owners to lay or ecclesiastical potentates, to be received back, and held under them as *beneficia*. By this arrangement the dependant bought the protection of a temporal or spiritual patron. Commendation was a similar arrangement, entered into without reference to land; the weaker man placed himself under the personal protection of a superior “without altering his title or divesting himself of his estate; he became a vassal and did homage. The placing of his hands between those of his lord was the typical act by which the connection was formed. And the oath of fealty was taken at the same time. The union of the beneficiary tie with that of commendation completed the idea of feudal obligation.” Both lord and “man” have a hold on the land; each has his duty to the other—the one to protect, the other to support. “A third ingredient was supplied by the grants of immunity by which the dwellers on a feudal property were placed under the tribunal of the lord, and the rights which had belonged to the nation or its chosen head were devolved upon the receiver of a fief.”

The system so formed was of mingled origin. The *beneficium* “is partly of Roman, partly of German origin;” commendation might be traced up to the *comitalus* or the Roman clientship, or possibly to Celtic usages of kindred ancestry. All these elements, the benefice proper, the surrendered alod, the personal commendation, the private jurisdiction, find their place in English as well as in French history, but the elements



were blended in different proportion, and under external conditions of a different character. In England the tie of the comitatus played an important part, and became the basis of the later Anglo-Saxon nobility. On the Continent the comitatus was soon lost in "the general mass of vassalage;" on the Continent territorial influences became paramount; in England personal and legal influences were never extinguished. Both in France and England the process of commendation was fostered by edicts of the central government, requiring, for purposes of police, that all persons of humble station should place themselves under lords. "The process by which the machinery of government became feudalized, though rapid, was gradual." In 843, the date of the great treaty of Verdun, two princes shared the land of France with Charles the Bold, namely, the King of Aquitaine and the Duke of Brittany. In 877 Charles was induced to publish a recognition of the hereditary character of benefices. By the end of the century nine-and-twenty provinces, or parts of provinces, had been erected into petty states; by the year 1000 the list had swelled to fifty-five. English indigenous feudalism had reached its height in 1017, when Cnut "dealt" all England into four earldoms—"to himself the West Saxons, to Thorkell the East Anglians, to Eadric the Mercians, and to Eric the Northumbrians." The four jurisdictions are spoken of as coördinate. Such a system, with time, might easily have ripened into continental feudalism. But William had no mind to encourage feudalism as a system of government; on the contrary, he took care to introduce that which England never before had enjoyed, a real central administration, and in that aspect he arrested the growth of feudalism in England. As a system of land tenure it was the only arrangement that he could have conceived or understood; and England was already so extensively feudalized in fact that it seemed the merest change of theory to make all subjects tenants, and the king the universal lord and sole alodial owner. The barons were allowed to take up the hereditary jurisdictions already existing on the estates on which they entered; but the administrative functions of the Anglo-Saxon earls were transferred to the king's sheriffs. The barons resisted, but William's strong arm kept them down; again and again under his two sons the struggle was renewed. "The English, who might never have struggled against native lords, were roused by the fact that their lords were strangers as well as oppressors, and the Norman kings realized the certainty that if they would retain the land they must make common cause with the people." Under Stephen feudalism burst out in all its horrors; fortunately the conflagration burnt itself out. The English rallied again round Henry II.; the great houses of the Conquest successively "suffered forfeiture or extinction;" the other Normans became Englishmen; and the legal and constitutional reforms of Henry II., with the help of the nation, "put an end to the evil."

FEUERBACH, LUDWIG ANDRES, fourth son of the eminent jurist (see next article), was born at Landshut in Bavaria on July 28, 1804. Like other members of his family, he evinced a religious turn of mind from an early age, and he matriculated at the university of Heidelberg with the intention of studying divinity. His ardor, however, was soon diverted to metaphysical pursuits; he repaired to Berlin, became an auditor of Hegel, and, in spite of his father's vehement opposition, devoted himself to the career of a teacher of philosophy. The history of his life henceforward is that of his gradual emancipation from the yoke he had thus imposed upon himself. Even his first work, *Thoughts on Death and Immortality* (1830), exhibits the marked

divergence between his mental characteristics and those of the Hegelian school. The conclusion, indeed, is Hegelian, but the author's method is dogmatic rather than dialectical, his cast of thought mystical, his phraseology original, animated with humor and pathos, and strikingly concrete. His negation of personal immortality rendered him obnoxious to the government, and frustrated his endeavors to obtain a professorship. His embarrassed manner and awkward delivery debarred him from success as a private tutor and lecturer. After some years of disappointment he renounced the attempt to gain a livelihood by philosophy, and married a lady whose scanty dower, derived from a share in a small manufactory, included free apartments in the castle of Bruckberg, and the use of a vegetable garden and shooting in the adjacent woods. In these idyllic circumstances the philosopher supported his family for nearly a quarter of a century—learning, as he declared, more from his peasant associates than he had learned at the university. "Berlin opened my mouth, Bruckberg my eyes." During his early struggles and the period of his betrothal he had produced his *History of Modern Philosophy*, a series of criticisms of leading thinkers from Bacon to Leibnitz, and his monograph on Pierre Bayle, whom he sets forth as the type of the antithesis between faith and knowledge. His rupture with Hegelianism was first indicated in his *Critique of Hegel* (1839). It was grounded on his growing aversion to mere verbal juggles, and his strengthening conviction that philosophical research must be based upon the investigation of actual phenomena.

The enthusiast for metaphysics had ceased to be a metaphysician, and had become the mouthpiece of a reaction the more remarkable from its independence of the contemporaneous development of physical science. The phenomena with which Feuerbach dealt were nevertheless wholly psychological. Those referring to the religious sentiment formed the subject of his next and most celebrated work, *The Essence (Wesen) of Christianity* (1841). In this famous treatise Feuerbach shows that every article of Christian belief corresponds to some instinct or necessity of man's nature, from which he infers that it is the creation and embodiment of some human wish, hope, or apprehension. The same process of interpretation is applied to natural religion in his essay on that subject (1845), and in his lectures delivered at Heidelberg during the revolutionary troubles of 1848 and 1849. This period of anarchy promised for a moment to bring Feuerbach prominently before the world; the inglorious collapse of the revolution gave an irrecoverable blow to his influence. Notwithstanding his own very reserved attitude, he had become identified in the public mind with the agitators who had made a watchword of his name, and unjustly participated in their discredit. He returned to Bruckberg, and occupied himself partly in scientific research, partly in the composition of his last important work, the *Theogony* (1857). Days of tribulation were now in store for him. Driven from his retreat at Bruckberg by the failure of the manufactory on which he had so long depended, too proud to implore aid, and incapable of writing for mere bread, he would have suffered the extremity of want but for the unsolicited contributions of a few friends, assisted shortly before his death by a public subscription. His intellectual faculties were impaired by successive strokes of paralysis, and he had ceased to take any active interest in human affairs when he expired on September 13, 1872.

Feuerbach is a remarkable figure in the history of modern thought. As a philosopher, he personifies at once the intellectual bankruptcy of mere verbal metaphysics, and the reaction toward empiricism based on



the actual observation of nature and society. He reaches substantially the same conclusions as the modern professor of physical science, but by a different path, and independently reproduces the scientific spirit of Positivism, with a total suppression of its sacerdotal element. As a writer on religion, his position is ambiguous. Following up the hint of one of the oldest Greek philosophers, he demonstrates that religious ideas have their counterparts in human nature, and assumes that they must be its product. "All theology is anthropology."

FEUERBACH, PAUL JOHANN ANSELM VON, a distinguished writer on criminal law, was born at Jena, November 14, 1775. In 1796 he published a *Critique of Natural Law* as preparation (*Propädeutik*) for a *Science of Natural Law*. This was followed, in 1798, by his *Anti-Hobbes*, a dissertation on the limits of the civil power, and the right of resistance on the part of subjects against their rulers, and his *Untersuchungen über das Verbrechen des Hochverraths*. In 1799 he obtained his degree of doctor of laws, and received permission to deliver a course of academical lectures. These attracted many hearers, and soon won for him the rank of a master in his science. At the same time appeared an important work, which established his reputation, the *Revision der Grundsätze und Grundbegriffe des peinlichen Rechts*. In this treatise he first set forth his new theory of punishment, the intimidation theory, which was further developed and applied in the *Bibliothek für die peinliche Rechtswissenschaft*, a work produced by Feuerbach in conjunction with Grolman and Von Almendingen, and published in 1800-1801, and was systematically and thoroughly expounded in his famous *Lehrbuch des gemeinen in Deutschland geltenden peinlichen Rechts* (1801), of which the fourteenth edition appeared in 1847. In these works Feuerbach shows himself not only a great thinker and discoverer of truth, but also a gifted teacher and luminous expositor, capable of giving to principles a scientific form, and investing them with the grace and elegance of the highest literary art. His works were a powerful protest against vindictive punishments, and contributed largely to the subsequent humane reformation of criminal laws. Nor was the example of his style without influence on later writers on law. In 1801 Feuerbach was appointed professor at the University of Jena; but many offers were made to him, and in the following year he accepted a chair at Kiel. This he held for two years, lecturing on the law of nature, criminal law, the institutes, the pandects, and hermeneutics. But, disappointed at not finding so numerous, sympathizing, or promising an audience as he had expected, he removed in 1804 to the university of Landshut. He was also named aulic counselor, and was commanded by the king, Maximilian Joseph, to draw up a project of penal law for Bavaria.

His position, however, was rendered painful and annoying by the jealousies and dislike of some of his fellow professors, who instigated the students to burlesque and ridicule him, and he resigned his chair. He was then called to Munich with the rank of privy referendary in the department of justice, and in 1808 was created privy counselor. Meanwhile appeared his *Critique on Kleinschrod's project of criminal law* (1804); and the practical reform of penal legislation in Bavaria was begun under his influence in 1806, by the abolition of torture. In 1808 appeared the first volume of his *Merkwürdige Criminalfälle*, completed in 1811—a work of deep interest for its application of psychological considerations to cases of crime, and intended to illustrate the inevitable imperfection of human laws in their application to individuals. In his *Betrachtungen über das*

*Geschworenengericht* (1812), Feuerbach declared against trial by jury, maintaining that the verdict of a jury was not adequate legal proof of a crime. Much controversy was aroused on the subject, and the author's view was subsequently to some extent modified. His labors on the penal law being completed, the project was submitted to rigorous examination, and, receiving ultimately the royal sanction, was promulgated in 1813 as the Bavarian penal code. The influence of this code, the embodiment in logical form of Feuerbach's enlightened and humane views, was immense. It was at once adopted as the model and basis for new codes for Würtemberg and Saxe-Weimar; it was adopted in its entirety in the grand-duchy of Oldenburg; and it was translated into Swedish by order of the king. Several of the Swiss cantons reformed their codes in conformity with it. Feuerbach had also undertaken to prepare a civil code for Bavaria, to be founded on the Code Napoléon. This was afterward set aside, and the Codex Maximilianus adopted as a basis. But the project did not become law. During the war of liberation (1813-1814), Feuerbach showed himself an ardent patriot, and published several political brochures, which, from the writer's position, had almost the weight of state manifestoes. One of these is entitled *Ueber Deutsche Freiheit und Vertretung Deutscher Völker durch Landstände* (1814). In 1814 Feuerbach was appointed second president of the court of appeal at Bamberg, and three years later he became first president of the court of appeal at Anspach. In 1821 he was deputed by the government to visit France, Belgium, and the Rhine provinces for the purpose of investigating their juridical institutions; and in 1825 he published, as the fruit of this visit, his treatise *Ueber die Gerichtsverfassung und das gerichtliche Verfahren Frankreichs*. In his later years he took a deep interest in the fate of Kaspar Hauser, which had excited so much attention in Europe; and he was the first to publish a critical summary of the ascertained facts, under the title of *Kaspar Hauser: ein Beispiel eines Verbrechens am Seelenleben* (1832). Shortly before his death appeared a collection of his *Kleine Schriften* (1833). Feuerbach, still in the full enjoyment of his intellectual powers, died suddenly at Frankfort, while on his way to the baths of Schwalbach, May 29, 1833.

FEUILLETON (a diminutive of *feuille*, the leaf of a book), a kind of supplement attached to the political portion of the French newspaper.

FEVER (from *ferveo*, to burn). This term which may be defined as a condition of the body characterized by an increase in temperature, is used in medicine with a wide application. Fever is one of the most common accompaniments of diseases in general, and serves to make the distinction between *febrile* and *non-febrile* ailments. In many cases the fever must be regarded as only secondary to, and symptomatic of, the morbid state with which it is found associated. But there is a large class of diseases in which fever is the predominant factor, and which, although differing widely among themselves as to their characters and pathological manifestations, are believed to arise from the introduction into the system of something of the nature of a poison, upon which all the morbid phenomena depend. To such diseases the term primary or specific fevers is applied.

In considering the general subject of fever regard must be had in particular to the two main features of the febrile process—viz., the abnormal elevation of temperature, and the changes affecting the tissues of the body in reference thereto. Indeed, the two points are inseparably associated.

FEYDEAU, ERNEST-AIMÉ, a French author, was born in Paris, March 16, 1821. He began his literary



career in 1844, by the publication of a volume of poetry of that mediocre quality which in poetry is fatal. Either the partial failure of this literary effort, or his marriage soon afterward to a daughter of the economist, Blanqui, caused him to forsake for a time the vocation of letters, and to devote his ambition to exchange transactions; but the study of archæology gradually supplanted his interest in speculation, and he was finally confirmed in his original choice of a literary profession by the remarkable success which attended the publication, in 1858, of his novel *Fanny*, a success due chiefly to the cleverness with which it depicted and excused the corrupt manners of a certain portion of French society. He died in Paris, October 28, 1873.

FEZ, one of the chief cities in the empire of Morocco, into which kingdom it was incorporated in the year 1548.

FEZZAN (the ancient *Phazania*, or country of the Garamantes), a country of the Sahara region of North Africa, forming a "kaimakamlık" of the Ottoman vilayet of Tripoli, extends 390 miles north to south from the town Bonjem, to Bir Omah, on the route from Murzuk to Bornu, and 420 miles east to west from the Akakus Mountains, near Ghat, to the village of Wau-Squair. Its ill-defined limits run from Bonjem, within fifty miles of the Mediterranean on the north, south-westward by the Birel-Hassi to the Akakus range east of Ghat, thence eastward to the Bir Omah south of the village of Tejerri, from that to Wau-Squair or Wau-Namus at its southeastern corner, and thence northward past Zella to Bonjem, embracing an area of about 156,000 English square miles.

FIACRE, ST., an anchorite of Irish descent, who was nobly born, but renounced his worldly advantages, and sailed to France to find a solitude where he might devote himself to fasting, prayer, and the practices of charity. On reaching Meaux he addressed himself to St. Faro, the bishop of the diocese, who assigned him a dwelling in the forest Breuil, in the province of Brie. Here Fiacre constructed a cell, and at a little distance from it an asylum for the reception of the strangers and pilgrims whom the fame of his austere life and charitable deeds soon attracted in large numbers. He died about 670, and his day is August 30th.

FIARS PRICES, in the law of Scotland, are the average prices of each of the different sorts of grain grown in each county, as fixed annually by the sheriff, usually after the verdict of a jury; and they serve as a rule for ascertaining the value of the grain due to feudal superiors, to the clergy or to lay proprietors of teinds, to landlords as a part or the whole of their rents and in all cases where the price of grain has not been fixed by the parties.

FIBERS, TEXTILE, in their widest acceptation include all substances capable of being spun, woven, or felted; but there are many materials and preparations which, though they can be and actually are woven, yet do not come within the range of fibers as technically understood. Thus metallic wires, although both spun into ropes and woven into wire-cloth for numerous purposes, are not generally reckoned among textile fibers, nor is horse-hair so regarded; it would, however, be difficult to frame a general definition that would not include such substances. Excluding these, and also leaving out of account fibers used solely as paper-making materials, there yet remain an enormous variety of materials more or less used and recognized as textile fibers. It is true that those of any considerable importance are comparatively few; but frequent additions are being made to the list of fibers of general utility; and improved methods of cultivation and preparation, as well as increased facilities of transport, tend to bring into general use

numerous kinds which formerly may have had only local and limited applications. All textile fibers of recognized commercial importance will be found noticed in detail under their special headings.

FIBRIN, or FIBRINE, is a member of the important group of albuminoid or proteinous substances which, embracing albumen, casein, gluten, and other allied compounds, constitute essential principles of animal and of the higher vegetable organisms. The substances are distinguished among themselves more by physical peculiarities and properties than by distinctions of chemical constitution, which, indeed, is so variable as to point to the conclusion that the various principles are not to be regarded as definite chemical compounds. In a physiological sense fibrin results from the union of two albuminoids which exist separately in the blood, fibrinogen and the fibrinoplastic substance.

FICHTE, JOHANN GOTTLIEB, one of the most eminent of modern German metaphysicians, was born at Rammenau in Upper Lusatia on May 19, 1762. His father, a ribbon-weaver in that village, was of Swedish origin, the first of the Fichte family having been a soldier in the army of Gustavus Adolphus, who was left wounded at Rammenau and settled there. All of the race were distinguished for piety, uprightness, and solidity of character. With these qualities Fichte himself combined a certain impetuosity of temper and impatience which were probably derived from his mother, a woman of somewhat querulous and jealous disposition. At a very early age the boy showed remarkable mental vigor and moral independence. A fortunate accident brought him under the notice of a neighboring nobleman, Freiherr von Miltitz, and was the means of procuring him a more excellent education than his father's circumstances would have allowed. By Von Miltitz he was placed under the care of Pastor Krebel at Niederau, who prepared him admirably for higher school instruction. After a short stay at Meissen he was then entered at the celebrated school or seminary at Pforta, near Raumburg. In 1780, after six years residence at Schulpforta, Fichte, whose patron Von Miltitz had unfortunately died, entered the university of Jena as a student of theology. His means did not permit him to prosecute an uninterrupted course of study; he supported himself mainly by private teaching, and during the years 1784-1788 acted as tutor in various families of Saxony. In 1787, after an unsuccessful application to the consistory for some pecuniary assistance, such as was frequently given to poor students of theology at the Saxon universities, he seems to have been altogether driven to miscellaneous literary work. A tutorship at Zurich was, however, obtained in the spring of 1788, through his friend Wessie, and Fichte spent in Switzerland two of the happiest years of his life. He made several valuable acquaintances, among others Lavater and his brother-in-law Hartmann Rahn, to whose daughter, Johanna Maria, he became engaged before leaving Zurich in 1790.

Settling at Leipsic, Fichte still found himself without any fixed means of livelihood, and was again reduced to literary drudgery, writing tales, plays, and reviews for the popular magazines. In the midst of this distracting work occurred the most important event of his life, his introduction to the philosophy of Kant. That Fichte had been already interested in philosophico-theological questions we know, but up to this period his speculations had been but desultory. At Schulpforta he had read with delight Lessing's *Anti-Goeze*, and during his Jena student days had occupied himself with the difficult problem of the relation between philosophy and religion. The outcome of his speculations, as exhibited in the fragmentary *Aphorismen über Religion und Deismus*



(unpublished, date 1790; *Werke*, i. 1-8), was a species of Spinozistic determinism, regarded, however, as lying altogether outside the boundary of religion. It is remarkable that even for a time should fatalism have been predominant in Fichte's reasoning, for in character he was throughout opposed to such a view, and, as he has said, "according to the man, so is the system of philosophy he adopts." With such half-formed opinions, Kant's philosophy was a new revelation. In particular, he seized upon the practical side, in which Kant works out his view of the absolute moral law as the essence of free intelligence. This doctrine lies at the root of all Fichte's after speculations; in fact, his system is merely the rigidly consistent evolution of the true relation between reason as practical and reason as cognitive.

Fichte's *Letters* of this period sufficiently attest the influence exercised on him by the study of Kant. It effected a revolution in his whole mode of thinking; and so completely did the Kantian doctrine of the inherent moral worth of man harmonize with his own character, that from this time forward his life becomes one effort to realize and perfect a true philosophy, and to make its principles no mere theoretic axioms, but practical maxims. At first he seems to have thought that the best method for accomplishing his object would be to expound Kantianism in a popular, intelligible form. He felt, and rightly, that the reception of Kant's doctrines was impeded by the clumsy and scholastic phraseology in which they were stated. An abridgement of the *Kritik der Urtheilskraft* was begun, but was left unfinished.

The circumstances of Fichte's life had not improved. No opening had presented itself, and it had been arranged in the beginning of 1791 that he should return to Zurich and be married to Johanna Rahn. This plan was overthrown by a commercial disaster which severely affected the fortunes of the Rahn family. Fichte accepted a post as private tutor to the family of a nobleman in Warsaw, and proceeded slowly on foot to that town. The situation proved unsuitable; the lady, as Kuno Fischer says, "required greater submission and better French" than Fichte could yield, and after little more than a fortnight's stay, Fichte set out for Königsberg, drawn thither by the desire to see Kant. His first interview with Kant was disappointing; the coldness and formality of the aged philosopher checked the enthusiasm of the young disciple, though it did not diminish his admiration and reverence. He resolved to bring himself before Kant's notice in a more effective manner by submitting to him some paper in which the principles of the Kantian philosophy should be applied. Such was the origin of the work written in four weeks, the *Versuch einer Kritik aller Offenbarung* (Essay toward a Critique of all Revelation). The problem which Fichte dealt with in this essay was one not yet handled by Kant himself, and the relations of which to the critical philosophy furnished matter for considerable surmise. Indirectly, indeed, Kant had indicated a very definite opinion on theology: from the *Critique of Pure Reason* it was clear that for him speculative theology must be purely negative, while the *Critique of Practical Reason* as clearly indicated the view that the moral law is the absolute content or substance of any religion. A critical investigation of the notion of revealed religion, an examination of the conditions under which religious belief was possible, was still, therefore an open problem. Fichte's essay was forwarded by him to Kant, who approved it highly, extended to the author a most warm reception, and exerted his influence to procure a publisher for the work. After some delay, consequent on the scruples of the theological censor of Halle, who did not like to see miracles rejected, the book appeared at

Easter, 1792. By an oversight of the publisher, Fichte's name did not appear on the title page, nor was the preface given, in which the author spoke of himself as a beginner in philosophy. Considering then the principles applied and the results reached, it was not unnatural that outsiders should ascribe the work to Kant himself. The *Allgemeine Literatur-Zeitung* went so far as to say that no one who had read a line of Kant's immortal writings could fail to recognize the eminent author of this new work. The mistake was soon rectified by Kant himself, who publicly announced the true author, at the same time highly commending the work. By this fortunate error Fichte's reputation was secured at a stroke, and he soon reaped the benefits of fame.

Fichte's literary success was coincident with an improvement in the fortunes of the Rahn family. There seemed now no reason for delaying his marriage, which accordingly took place at Zurich, in October, 1793. The remainder of the year he spent in retirement at Zurich, slowly perfecting his thoughts on the fundamental problems left for solution in the Kantian philosophy. During this period also, he published anonymously two remarkable political works, *Zurückforderung der Denkfreiheit von den Fürsten Europa's*, and *Beiträge zur Berichtigung der Urtheile der Publicums über die französische Revolution*. Of these, the latter is much the more important. The French Revolution seemed, to many earnest thinkers, the one great outcry of modern times for the liberty of thought and action which is the eternal heritage of every human being. Unfortunately, the political condition of Germany was unfavorable to the formation of an unbiased opinion on the great movement. The principles involved in it were lost sight of under the mass of spurious maxims on social order which had slowly grown up and stiffened into system. To direct attention to the true nature of revolution, to demonstrate how inextricably the right of liberty is interwoven with the very existence of man as an intelligent agent, to point out the inherent progressiveness of state arrangements, and the consequent necessity of reform or amendment, such are the main objects of the *Beiträge*; and although, as is often the case with Fichte, the arguments are too formal, and the distinctions too wire-drawn, yet the general idea is nobly conceived and carried out. As in the *Critique of Revelation*, so here, the rational nature of man, and the conditions necessary for its manifestation or realization, become the standard for critical judgment.

Toward the close of 1793, Fichte received an invitation to fill the post of extraordinary professor of philosophy at Jena, vacant by the transference of Reinhold to Kiel. This chair, though not in the ordinary faculty, had become, through Reinhold, the most important in the university, and great deliberation was exercised in selecting his successor. It was desired to secure an able exponent of Kantianism, and none seemed so highly qualified as the author of the *Critique of Revelation*. Fichte, while accepting the call, at first desired to delay entry on his duties for a year, in order to be more thoroughly prepared; but as this was deemed inexpedient, he rapidly drew out an introductory outline of his system, for the use of his students, and began his lectures in May, 1794. His success was instantaneous and complete. The fame of his predecessor was altogether eclipsed; as Forberg writes, "Fichte is believed in as Reinhold never was. The students understand him even less than they did his predecessor, but they believe all the more earnestly on that account." Much of this success was undoubtedly due to Fichte's power as a lecturer. In oral exposition, the vigor of thought and moral intensity of the man were most of all apparent, while his practical earnestness completely captivated his hearers. He



lectured not only on philosophy to his own class, but on general moral subjects to all students of the university. These general addresses, published under the title *Vocation of the Scholar* (*Bestimmung des Gelehrten*), were on a subject very dear to Fichte's heart, the supreme importance of the highest intellectual culture, and the duties incumbent on those who had received it. Their tone is stimulating and lofty.

The years spent at Jena were unusually productive; indeed, the completed Fichtean philosophy is contained in the writings of this period. A general introduction to the system is given in the tractate *On the Notion of the Theory of Science*, and the theoretical portion is worked out in the *Foundation of the whole Theory of Science* and *Outline of what is peculiar in the Theory of Science*. To these were added in 1797 a *First* and a *Second Introduction to the Theory of Science*, and an *Essay towards a new Exposition of the Theory of Science*. The *Introductions* are masterly expositions. The practical philosophy, which was with Fichte the fundamental, was given in the *Grundlege des Naturrechts*, 1796, and *System der Sittenlehre*, 1798. The last is, we think, the most important of all Fichte's works; apart from it, his theoretical philosophy is unintelligible and absurd.

During this period of literary activity Fichte's academic career had been troubled by various storms, the last so violent as to put a close to his professoriate at Jena. The first of them, a complaint against the delivery of his general addresses on Sundays, was easily got over. The second, arising from Fichte's strong desire to suppress the *Landsmannschaften*, or student's orders, which was productive of much harm, was more serious. Some misunderstanding caused an outburst of ignorant ill-feeling on the part of the students, who proceeded to such lengths that Fichte was compelled to obtain leave to reside out of Jena. The third storm, however, was the most violent. In 1798 Fichte, who, with Niethammer, had edited the *Philosophical Journal* since 1795, received from his friend Forberg an essay on the "Development of the Idea of Religion." With much of the essay he entirely agreed, but he thought the exposition in so many ways defective and calculated to create an erroneous impression, that he prefaced it with a short paper *On the Grounds of Our Belief in a Divine Government of the Universe*, in which God is defined as the moral order of the universe, the eternal law of right which is the foundation of all our being. Any other mode of existence must be denied to him. Against these papers the cry of atheism was raised, and the electoral government of Saxony suppressed the *Journal* and confiscated the properties found in their universities, acts imitated by all the German states except Prussia. The Duke of Saxe-Weimar, patron of Jena University, was almost ordered to reprove and dismiss the offenders.

Berlin was now the only town in Germany open to him. His residence there from 1799 to 1806 was only broken by the delivery of lectures during the summer of 1805 at Erlangen, where he had been named professor. Surrounded by friends, including such men as Schlegel and Schleiermacher, he continued his literary work, perfecting and amending the *Wissenschaftslehre*. The most remarkable of the works from this period are—*Vocation of Man* (1800), a book which, for beauty of style, richness of content, and elevation of thought, may be ranked with the *Meditations* of Descartes; *The Exclusive or Isolated Commercial State*, a very remarkable treatise, intensely socialist in tone, and bitterly opposed to free-trade and competition, inculcating in fact organized protection. In 1801 was also written the *Darstellung der Wissenschaftslehre*, which was not published till

after his death. In 1804 a set of lectures on the *Wissenschaftslehre* was given at Berlin, the notes of which were published in the *Nachgelassene Werke*, vol. ii. In 1804 were also delivered the noble lectures on the *Characteristics of the Present Age*. The philosophy of history sketched in this work has something of value with much that is fantastic and absurd. In 1805 and 1806 appeared the *Nature of the Scholar* and the *Way to a Blessed Life*, the latter the most important work of this Berlin period. In it the union between the finite self-consciousness and the infinite ego or God is handled in an almost mystical manner. The knowledge and love of God is the end of life; by this means only can we attain blessedness, for in God alone have we a permanent, enduring object of desire. The infinite God is the all; the world of independent objects is the result of reflection or self-consciousness, by which the infinite unity is broken up. God is thus over and above the distinction of subject and object; our knowledge is but a reflex or picture of the infinite essence. Being is not thought.

The disasters of Prussia in 1806 drove Fichte from Berlin. He retired first to Stargard, then to Königsberg (where he lectured for a time), then to Copenhagen, whence he returned to the capital in August, 1807. From this time till his death his only published writings are practical in character; not till after the appearance of the *Nachgelassene Werke* was it known in what shape his final speculations had been thrown out. We may here note the order of these posthumous writings as being of importance for tracing the development of Fichte's thought.

During these later years, however, Fichte's energies were mainly occupied with public affairs. In 1807 he drew up an elaborate and minute plan for the proposed new University of Berlin. In 1807-1808 he delivered at Berlin, amidst danger and discouragement, his noble addresses to the German people. Even if we think that in these pure reason is sometimes overshadowed by patriotism, we cannot but recognize the immense practical value of what he recommended as the only true foundation for national prosperity.

In 1810 he was elected rector of the new university founded in the previous year. This post he resigned in 1812, mainly on account of the difficulties he experienced in his endeavor to alter and amend the student life of the university.

In 1813 began the great effort of Germany for national independence. Debarred from taking an active part, Fichte made his contribution by way of lectures.

In the autumn of 1813 the hospitals of Berlin were filled with sick and wounded from the campaign. Among the most devoted in her exertions was Fichte's wife, who, in January, 1814, was attacked with a virulent hospital fever. On the day after she was pronounced out of danger Fichte was struck down by the same disease. His constitution, weakened by severe illness in 1808, was unable to withstand the attack. He lingered for some days in an almost unconscious state, and died on January 27, 1814.

FICHELGEIRGE, a mountain group of Bavaria, Germany, forming the center from which three extensive mountain ranges proceed—the Erzgebirge in a northeasterly, the Frankenwald in a northwesterly, and the Böhmerwald in a southeasterly direction.

FICINO, MARCELLO, was born at Figline, in the upper Arno valley, in the year 1433. His father, a physician of some eminence, settled in Florence, and attached himself to the person of Cosimo de Medici.

During the session of the council for the union of the Greek and Latin churches at Florence in 1439, Cosimo had made acquaintance with Gemistos Plethon, the Neo-



Platonic sage of Mistra, whose discourses upon Plato and the Alexandrian mystics so fascinated the learned society of Florence that they named him the second Plato. It had been the dream of this man's whole life to supersede both forms of Christianity by a semi-pagan theosophy deduced from the writings of the later Pythagoreans and Platonists. When, therefore, he perceived the impression he had made upon the first citizen of Florence, Gemistos suggested that the capital of modern culture would be a fit place for the resuscitation of the once so famous Academy of Athens. Cosimo took this hint. The second half of the fifteenth century was destined to be the Age of Academies in Italy, and the regnant passion for antiquity satisfied itself with any imitation, however grotesque, of Greek or Roman institutions. In order to found his new academy upon a firm basis Cosimo resolved, not only to assemble men of letters for the purpose of Platonic disputation at certain regular intervals, but also to appoint a hierophant and official expositor of Platonic doctrine. He hoped by these means to give a certain stability to his projected institution, and to avoid the superficiality of mere enthusiasm. The plan was good; and with the rare instinct for character which distinguished him, he made choice of the right man for his purpose in the young Marsilio.

Before he had begun to learn Greek, Marsilio entered upon the task of studying and elucidating Plato. It is known that at this early period of his life, while he was yet a novice, he wrote voluminous treatises on the great philosopher, which he afterward, however, gave to the flames. In the year 1459 John Argyropoulos was lecturing on the Greek language and literature at Florence, and Marsilio became his pupil. He was then about twenty-six years of age. Seven years later he felt himself a sufficiently ripe Greek scholar to commence the translation of Plato, by which his name is famous in the history of scholarship, and which is still the best translation of that author Italy can boast.

As a philosopher, he can advance no claim to originality, his laborious treatise on Platonic theology being little better than a mass of ill-digested erudition. As a scholar, he failed to recognize the distinctions between different periods of antiquity and various schools of thought. As an exponent of Plato he suffered from the fatal error of confounding Plato with the later Platonists. It is true that in this respect he did not differ widely from his contemporaries. He died in 1499.

F I C T I O N S, in law, or legal fictions, are false averments, the truth of which is not permitted to be called in question. English law as well as Roman law abounds in fictions. Sometimes they are merely the condensed expression of a rule of law — *e. g.*, the fiction of English law that husband and wife are one person, and the fiction of Roman law that the wife is the daughter of the husband. Sometimes they must be regarded as reasons invented in order to justify a rule of law according to an implied ethical standard. Of this sort seems to be the fiction or presumption that every one knows the law, which reconciles the rule that ignorance is no excuse for crime with the moral commonplace that it is unfair to punish a man for violating a law of whose existence he was unaware. Again, some fictions are deliberate falsehoods, adopted as true for the purpose of establishing a remedy not otherwise attainable. Of this sort are the numerous fictions of English law by which the different courts obtained jurisdiction in private business, removed inconvenient restrictions in the law relating to land, etc.

F I D E N Æ, identified with the modern CASTILLO GIUBILEO, an old and important Latin city on the left bank of the Tiber, about five miles above Rome. It is

said by Livy to have owed its origin to the Etruscans; but his testimony is not supported by any other historian. There is no Latin city which plays so important a part in the annals of regal Rome. According to the tradition of the Roman historians, hostilities first broke out between the two cities in the time of Romulus, and continued with little intermission and various success till 496 B.C., when, being abandoned by its allies, it was forced to yield to the Roman arms. In 438 B.C. the Fidenates revolted and slew the Roman ambassadors, but after maintaining for twelve years an unequal contest, their city was taken and plundered, and themselves sold into slavery. From this time Fidenæ almost disappears.

F I E L D, JOHN, one of the most remarkable pianists of his time and of the few composers of British origin whose works have acquired European reputation, was born at Dublin in 1782. He was descended from a musical family, his father being a violinist, and his grandfather the organist in one of the churches of Dublin. From the latter the boy received his first musical education. When a few years later the family settled in London, Field became the favorite pupil of the celebrated Clementi, whom he accompanied to Paris, and later, in 1802, on his great concert tour through France, Germany, and Russia. Under the auspices of his master Field appeared in public in most of the great European capitals, especially in St. Petersburg, and in that city he remained when Clementi returned to England. During his stay with the great pianist Field had to suffer many privations, owing to Clementi's all but unexampled parsimony; but when the latter left Russia his splendid connection amongst the highest circles of the capital became Field's inheritance. Fame and wealth were now within his grasp, but owing to his extravagant and dissipated way of life the composer was never free from care; and to the same cause his early end must no doubt be attributed. His marriage with a French lady of the name of Charpentier was anything but happy, and had soon to be dissolved. Field made frequent concert tours to the chief cities of Russia, and in 1820 settled permanently in Moscow. In 1831 he went to England for a short time, and for the next four years led a migratory life in France, Germany, and Italy, exciting the admiration of amateurs wherever he appeared in public. In Naples he fell seriously ill, and lay several months in the hospital; till a Russian family discovered him and brought him back to Moscow. There he lingered for several years till his death on January 11, 1837.

F I E L D, NATHAN, a dramatist and actor of the time of Elizabeth, was probably born about, but not later than, 1587. He was the son of the rector of Cripple-gate, the Rev. John Field, and early became one of the children of Queen Elizabeth's chapel, and in 1600 he played one of the principal parts in Ben Jonson's *Cynthia's Revels*, which was acted by children. Next year he played in the *Poetaster*, in 1607 in *Bussy d'Ambois*, and in 1608 in *Epicene*, on which occasion his is the only name among the "children" of 1600 which still remains. In 1612, when he must have been very young, he brought out his first play, the original comedy of *A Woman is a Weathercock*, in which the inconstancy of woman is made a theme fertile in humor. In 1613 he was engaged with Daborne in writing a play which has not been handed down to us; and soon afterward we find these two authors, in conjunction with Massinger, praying Henslowe for a small sum of money to free them from imprisonment. In 1618 Field printed *Amends for Ladies*, in which he reversed the judgment of his first comedy, and, in the persons of a virtuous maid, wife, and widow, vindicated womankind against himself. It



has been supposed that Field had some hand in editing the first folio Shakespeare in 1623; he certainly assisted Massinger in that year in composing his tragedy of *The Fatal Dowry*, and the play bears evident traces of his coöperation. In 1639 he reprinted the *Amends for Ladies*, and in 1641 he was dead.

FIELDFARE, Anglo-Saxon *Fealo-for* (=Fallow-farer), a large species of Thrush, the *Turdus pilaris* of Linnæus—well known as a regular and common autumnal visitor throughout the British Islands and a great part of Europe, besides Western Asia, and even reaching Northern Africa. It is the *Veldjakker* and *Veld-lyster* of the Dutch, the *Wachholderdrossel* and *Kramtsvogel* of Germans, the *Litorne* of the French, and the *Cesena* of Italians. This bird is of all Thrushes the most gregarious in habit, not only migrating in large bands and keeping in flocks during the winter, but even commonly breeding in society—200 nests or more having been seen within a very small space. The birch-forests of Norway, Sweden, and Russia are its chief resorts in summer, but it is known also to breed sparingly in some districts of Germany. Though its nest has been many times reported to have been found in Scotland, there is perhaps no record of such an incident that is not open to doubt; and unquestionably the Mistletoe-Thrush has been often mistaken for the Fieldfare by indifferent observers. The head, neck, upper part of the back, and the rump are gray; the wings, wing-coverts, and middle of the back are rich hazel-brown; the throat is ochraceous, and the breast reddish-brown—both being streaked or spotted with black, while the belly and lower wing-coverts are white, and the legs and toes very dark brown. The nest and eggs resemble those of the Blackbird, but the former is usually built high up in a tree. The Fieldfare's call-note is harsh and loud, sounding like *t'chat-t'chat*: its song is low, twittering, and poor.

FIELDING, ANTHONY VANDYKE COPLEY, commonly called Copley Fielding, was born in 1787 and became at an early age a pupil of John Varley. He took to the water color method of art, and to this he confined himself almost exclusively. In 1810 he became an associate exhibitor in the Water-color Society, in 1813 a full member, and in 1831 president of that body. He also engaged largely in teaching the art. His death took place at Worthing in March, 1855.

FIELDING, HENRY. Henry Fielding was born at Sharpham Park, near Glastonbury, Somersetshire, on April 22, 1707. There was nothing in the circumstances of his birth to foreshow that the descendant of such illustrious ancestors would drift as rapidly as he did into Bohemia. His father, the youngest son of the Earl of Desmond, and grandson of the first Earl of Denbigh, is said to have distinguished himself as an officer under Marlborough, though the details of his career are not known. Shortly after the battle of Ramillies, he appears settled in England as a country squire, having married the daughter of Sir Henry Gould, a judge of the King's Bench. As Captain Fielding's family grew, and his love of profuse hospitality manifested itself, and when, on the death of his first wife, he married a second time, and this marriage also proved fertile, it became apparent that his eldest son, the future novelist, would have little patrimony but his wits. His book education had been conducted so far in the ordinary way; he had been taught at home by the family chaplain (said to be the original of Parson Trulliber), and in due course was sent to Eton. But he did not proceed to Oxford with his schoolfellows Lyttleton and Pitt, but, probably from the growing needs for economy at home, was dispatched to the University of Leyden.

As we know only the barest leading facts about that

interesting seminarial period, the first twenty years, of Fielding's life, we can hardly venture even a guess at the circumstances which had given such early encouragement to the bent of his genius that he returned from Leyden after two years' residence there, bringing with him as the chief fruit of his studies a first sketch of a comedy called *Don Quixote in England*. The most significant incident in the records of his early life is his friendship with the studious, ambitious, precocious Lyttleton, a friendship which cannot have been without a powerful influence on an impressionable boy, whose high animal spirits and keen relish for existence did not predispose him to study. In after years the novelist made a point of displaying, with a certain degree of ostentation, the solid learning which he then acquired, and with all his rollicking dash and recklessness devoted himself to severe intellectual labor with a zeal which we never find in those who have spent an idle youth. There is no genius so easily dissipated and diverted from the creation of imperishable works as that of humor; and it is a fair conjecture that the abundant gifts of the "prose Homer" received direction and stimulus from his friend's example as well as his father's impecuniosity. He had no talent for the versification in which Lyttleton delighted and attained such success as to find a place among Johnson's Poets; the only distinction he achieved in that line was the mention of his name by Swift as an unapproachable master of the art of sinking. We can conceive that Fielding's sympathy with his friend's pretty pastoral fancies and glowing heroics was not invariably earnest; still his thoughts had been turned toward literature and learning, while his genius was left free to discover its own natural path.

None of Fielding's plays, with the exception, perhaps, of his adaption the *Miser*, can be said to have "kept the stage;" few even of the students of literature have read them, and those who have read them have dismissed them too hastily. The closest students these plays have ever had were the dramatists of the following generation, whose works, notably those of Sheridan, contain many traces of their assiduity. The tradition about his writing scenes after his return from tavern carousals on the papers in which his tobacco had been wrapt, and his cool reception of Garrick's desire that he should alter some passage in the *Wedding-Day*, have helped the impression that they were loose, ill-considered, ill-constructed productions, scribbled off hastily to meet passing demands. There is only a fraction of the truth in this notion. That the plays are not the work of a dull plodder or a mechanic of elaborate ingenuity goes without saying; but, though perhaps rapidly considered and rapidly constructed, they are neither ill-considered nor ill-constructed, and bear testimony to the large and keen intelligence, as well as the overflowing humor and fertile wit of their author. With all Fielding's high spirits, joyous self-confidence, and disdain of criticism, he was no idler over his work; whatever his hand found to do, writing plays, or newspaper articles, or novels, reading law, or administering justice, he did with all his might. He found in play-writing abundant scope for the exercise of that farsighted and fertile constructive faculty which gave the world afterward in *Tom Jones* one of the most perfect plots in literature. His plays abound in artfully prepared surprises, and the conclusions are never huddled, confused, and unsatisfactory; he never lacked the skill to unloose the knots which he had had the ingenuity to tie. It may be taken as a national characteristic, whether in the way of merit or defect must be for others to say, that he wrote for the stage as he found it, and practiced its methods as he found them, troubling himself little with theories of what it and they ought to be. If we know anything of the



actors and actresses who took part in his plays, it is amusing to trace the skill with which he adapted himself to their peculiarities. With regard to his moral tone, it is substantially the same as that which pervades *Tom Jones*. He had no sympathy whatever with the goodness or goodiness of Addison and Steele. His creed is stated in the prologue to the second of his plays, "written by a friend," perhaps the same friend to whom he says he owed the first suggestion of *Tom Jones*, the friend of his school-days, Lord Lyttleton. Some persons, this prologue runs,

"Will argue that the stage  
Was meant to improve and not debauch the age.  
Pshaw! to improve! the stage was first designed  
Such as they are to represent mankind."

If we desire to draw a distinction between Fielding's morality and that of the Restoration dramatists, we should say that he takes more care that the rakes shall not have the best of it.

Very early in his dramatic career Fielding discovered how much of his strength lay in burlesque. The obligations which he professed to owe to Cibber in the preface to his first comedy did not prevent him from turning that versatile writer and his son Theophilus to ridicule very soon afterward. That Cibber, in the meantime, had offended him by refusing the *Temple Beau*, which was not acted at Drury Lane, or the *Wedding-Day*, which was originally intended for Mrs. Oldfield and Wilkes, is likely enough; if so, the *Author's Farce*, in which a poor play-writer reads a play to the manager and receives his comments upon it, listening all the while to his self-glorification, was an ample revenge. In *Tom Thumb*, a burlesque on inflated tragedy, in which the taste introduced by Dryden and other tragic dramatists of the Restoration period is parodied with irresistible humor, the satire is of a less personal kind, and can be read now with more enjoyment. Fielding, with the consciousness of his aristocratic descent as well as his superior powers, had a large share of Pope's contempt for Grub Street, and was a sort of Ishmael among his play-writing brethren, losing no opportunity of girding at them, and complaining to the public more than once that they had conspired to "damn" his plays. He found, too, another field for his satire in the political corruption of the time. When he returned from Leyden to London, he had solicited the patronage of Sir Robert Walpole, as was the custom of the time, in a copy of verses, but the great minister had paid no heed to them. He was thus left free to indulge his humor. The election scenes in *Don Quixote*, in which he gave a ludicrous representation of the corrupt arts of politicians and the venality of corporations, had made a hit; and when Fielding took the Haymarket Theater, and assembled a company of unemployed actors, he endeavored to crown this success by a still bolder lampoon on the times. The mock-comedy in *Pasquin* is an election scene, in which he gratifies at the same time his contempt for the performances of rival playwrights and his hatred of political dishonesty. When *Pasquin* was followed up by the *Historical Register*, in which the political transactions for the previous year were freely travestied, the legislature deemed it time to interfere; and after a witty and eloquent protest from the Earl of Chesterfield, in which he argued against the measure as an attack upon the property of authors' wit, "too often the only property they have to depend on," a bill was passed to amend the Acts relating to rogues, vagabonds, sturdy beggars, and vagrants, by a provision that every dramatic piece, previous to its representation, should receive the license of the lord chamberlain. Fielding was thus responsible for the institution of the lord chamberlain's censorship of the stage.

The institution of the lord chamberlain's censorship, and the consequent dispersion of the Great Mogul's company, was a great discouragement to Fielding's playwriting, just as he had hit upon a new and profitable vein. In 1737 he entered as a student of the Middle Temple, and devoted himself with great energy to the study of the law. As a gap of two years occurs at this period in the series of his literary publications, we may probably set this down as the date of his marriage and his experiment at living in the country. Before he had completed his terms, he again had recourse to literary employment, projecting, in conjunction with a journalist of the name of Ralph, a thrice-a-week journal called the *Champion*. It is based on the model of the *Spectator* and the *Tatler*, but in the first number, in which Fielding gives an account of his contributors — different members of the great family of Vinegar — and his purposes, he announces his intention of discussing politics freely as well as literary and social subjects, laying down as his "platform" the reduction of the army, the abolition of useless offices, the restoration of triennial parliaments, and the removal of "that grand anti-constitutional first mover, a prime minister." As the journal went on, these objects did not assume a prominent place; still, the *Champion* is broader in its scope and more rollicking in its tone than the *Spectator*, as might have been expected from the less decorous character of its principal writers. In two volumes of it which were republished in 1741, the work of the different contributors is indicated, and we find among Fielding's essays the germs of many of the disquisitions with which he afterward adorned his novels. In the *Champion* also he renewed his warfare with Cibber, who had turned upon his witty persecutor and assailed him angrily in his *Apology* as "a broken wit," who, in his "haste to get money," did not scruple to "draw the mob after him," by "raking the channel and pelting their superiors." Fielding's temper was disturbed but not overthrown by this furious onslaught; he retorted merrily by drawing up an account of a trial of the laureate for murder, the murder of his native tongue. At the same time the bitter taunts rankled, and prompted Fielding to many further reprisals. It was significant of Cibber's power of stinging that his enemies could never let him alone.

The next episode in Fielding's life was a serious attempt to get practice at the bar. He was called to the bar in June, 1740, and we are assured by Murphy that he threw himself earnestly into the work, forswore literature, attended Westminster Hall diligently, went circuit; but briefs did not come in, he could not afford to wait, and was compelled, however reluctantly, to return to his old trade.

Fielding returned to literature, but in a new character. A few months after he was called to the bar Richardson's novel *Pamela* was published, and was received with the favor always accorded to whatever is fresh and out of the beaten track. Richardson's novels are somewhat tedious reading now, but their simplicity and close adherence to nature were a new revelation to a public surfeited with the extravagant improbabilities and fictitious heroic manners of the school of romance of which *Parthenissa* was the most illustrious example in English. *Pamela* at once became a book that everybody had to read. Fielding read it, but with less reverence and admiration than the ladies of the time. A man cannot escape from the prevalent moral teaching of his generation; his attitude toward it must be either sympathetic or militant. The prosperous evenly conducted printer had complete sympathy with the worldly ethics of the eighteenth century; the idea of writing *Pamela* had been put into his head by the suggestion that



he should write "a little book of familiar letters on the useful concerns of common life;" and in his earnestness to promote the cause of religion and virtue he saw nothing absurd in making a young maid-servant resist the improper advances of her master and be sustained in her resistance by a secret hope that he might be driven by his passion into offering her lawful marriage. To Fielding, on the other hand, there was something ludicrous in good conduct which was so closely allied to artfulness, and he was moved to write a parody of Mrs. Andrews's virtue and distressing humility in the adventures of Joseph Andrews, who "by keeping the excellent pattern of his sister's virtues before his eyes," was enabled to preserve his purity in the midst of great temptations. *Joseph Andrews*, published in 1742, was thus in its original conception a parody of *Pamela*, but the author, though he began it with this intention, and executed his intention with inimitable wit, became aware as he went on that he was introducing a kind of writing as new in its way to English readers as *Pamela* itself, and when he issued the work he endeavored in his preface to place it on a higher ground than mere burlesque. There was a wide difference, he said, between the comic and the burlesque—the burlesque writer striving to exhibit what is monstrous, unnatural, delightfully and surprisingly absurd, while the comic writer confined himself strictly to nature, and was of all writers the last to be excused for deviating from it, because "life everywhere furnishes an accurate observer with the ridiculous." Distinguishing epic writing into the tragic and the comic, and "not scrupling to say" that it might be in prose as well as in verse, Fielding claimed for *Joseph Andrews* the title of a comic prose epic. The author's criticism on his own work has never been surpassed for justness; it is a striking testimony that genius is not always unconscious of its own excellence. He was equally correct in describing the novel as being "written in the manner of Cervantes," for in *Joseph Andrews* there is the same blending of the ludicrous, the admirable, and the pathetic as in the character of the knight of La Mancha. The humble squire, not the knight was his hero, but he had at last succeeded in the dream of his youth, introducing Don Quixote into England.

It may be assumed that the most irritating thing to Richardson in Fielding's parody was the humorous malice of making Pamela endeavor to dissuade her brother from lowering their family by marrying poor Fanny. This wise advice was too nearly in keeping with the prudent character of Mrs. B. (or, as Fielding filled out the initial, Mrs. Booby); and that a person of low habits should preach a higher, or at least a more spiritual morality than himself, must have been gall and wormwood to the moralist.

Fielding's enlogy was venal, whatever consideration he may have received for the service. In May of the same year (1742) his last composition for the stage, *Miss Lucy in Town*, a sequel to an *An Old Man Taught Wisdom*, was produced at Drury Lane; but the enemy whom he had raised up, the lord chamberlain, prohibited the piece, when it had run successfully for several nights, because one of the characters was supposed to be a satire on a person of quality. Early in the following year he was induced to undertake to recast for Garrick his comedy of *The Wedding-Day*, the third comedy he ever wrote, which had been rejected years before by a manager, possibly Cibber. The serious illness of his wife prevented him from recasting the play; produced as it stood, it was a failure. This was the end of Fielding's connection with the stage.

In 1743 Mrs. Fielding caught a fever, and died, Lady Mary W. Montague says, in her husband's arms. For

two years afterward he published nothing but a preface to his sister's novel, *David Simple*. Although Sarah Fielding was one of Richardson's favorites, and heard laments from him about her brother's "continued lowness," she seems to have comforted that low brother in his sorrow, and even lived in the same house with him. It was probably at this time that Fielding received from Lord Lyttelton the assistance which he gratefully acknowledges in the dedication of *Tom Jones*. As that masterpiece is said to have been "the labor of some years of his life," we may conjecture that it was begun some time during these otherwise barren years, and that, as *Don Quixote* was written in a prison, *Tom Jones* was written when its author was only saved from despair and destitution by the tender kindness of two life-long friends.

In 1745 Fielding made a second successful venture in periodical literature. In November of that year, when London was agitated by the news of the preparations of the Jacobites for marching across the border, he issued the first number of the *True Patriot*, in which he brought all his powers of ridicule and his robust sense to the service of the established government. He continued the publication of the *True Patriot* till the rebellion was suppressed. More than a year afterward, in December, 1747, he began another periodical, called *The Jacobite Journal*, the object of which he stated to be "to eradicate those feelings and sentiments which had been already so effectually crushed on the field of Culloden." In both these ventures he was probably assisted by his staunch friend Lyttelton. One of the reasons he gave for starting them was the lamentable ignorance of the common run of journalists, and the greater accuracy of the information at his command, a taunt and boast for which his rivals retaliated by copious personal abuse, and the accusation that he was in the pay of the government. If Fielding was in the pay of the government, they made but a poor return for his support when it was no longer required. Soon after the discontinuance of the *Jacobite Journal*, toward the close of 1748, he obtained, again, it is said, through Lyttelton's assistance, the post of a paid Middlesex magistrate. In one of his earliest comedies Fielding had thrown hearty ridicule on these functionaries, who had brought their office into disrepute by their scandalous venality. It was notorious that they eked out their small fees by selling justice to the highest bidder. When Fielding himself accepted such an office his enemies exulted loudly over the step as a degradation.

Fielding's enemies did not scruple to say that in his discharge of his duties as a justice he was no better than his own Justice Thrasher; but there was no foundation for the charge—it was only a personal retort in the coarse manner of the time.

A few months after his appointment to the justiceship, in February, 1749, Fielding published his masterpiece, *The History of Tom Jones, a Foundling*. Here we have the ripe fruits of his life. His varied experience supplied his imagination with abundant suggestions of incident. His long struggle with his pen for a livelihood had given elasticity to his style. His mind was full; the hackwork, which would have exhausted poorer energies had mobilized his, and made him perfect master of his resources. Hard minds, like stones, are not enriched by rolling; but Fielding's mind was of the plastic sort, and went on gaining by its incessant movement. His heart, too, had remained as fresh as his brain. His own life had been far from scrupulously pure, but he could still give the world "a miracle of loveliest womanhood" in Sophia Western. His name had been a byword and reproach in respectable circles from his early manhood upward, but he could still write in deprecation of the cynical philosophy of Mandeville,



and create a pattern English gentleman in Squire Allworthy.

As soon as *Amelia* was off his hands, Fielding bent himself with unflagging energy to a new enterprise. In January, 1752, he issued the first number of a new periodical, the *Covent Garden Journal*, "by Sir Alexander Drawcansir, Knight, censor of Great Britain." In the first number he proved that his appetite for literary warfare was undiminished, giving fair warning to "scribblers" in general that they must expect no mercy; and soon after, he began an exchange of personalities with Dr. John Hill which Disraeli has thought worthy of a place among his quarrels of authors. Among other writers who accepted Fielding's challenge was Smollett, whose ground of quarrel was probably political, but to him Fielding made no reply. He was never an indiscriminate satirist, either in words or in literature; he reserved his lash for what he believed to be bad, and not even provocation could make him attack a man whose writings he respected.

The *Covent Garden Journal* was discontinued toward the end of 1752, partly, it may be supposed, in consequence of Fielding's health making him unable to bear the strain. He had long been a sufferer from gout; he had undermined his naturally robust constitution by hard work and reckless living; and in 1753 his frame began to exhibit symptoms of dropsy. The narrative of the last painful year of his life is given in his *Journal of a Voyage to Lisbon*. At a moment when the disease might have been curable, or at least might have been delayed in its ravages, he was kept in town to carry out a scheme for putting down organized gangs of robbers who were setting the law at defiance. He tried the effect of the waters at Bath; he experimented on himself with Bishop Berkeley's specific of tar-water; he submitted frequently to the operation of tapping; but the summer of 1754 found him with "the dropsy gaining rather than losing ground, the distance growing still shorter between the tappings." In June he set sail for Lisbon to give himself the chance of a milder winter; but the precaution was unavailing. He died at Lisbon on October 8, 1754.

FIERI FACIAS, an English law, is a writ of execution after judgment obtained in action of debt or damages. It is addressed to the sheriff, and commands him to make good the amount out of the goods of the person against whom judgment has been obtained.

FIESCHI, JOSEPH MARIE, assassin, the chief conspirator in the attempt on the life of Louis Philippe in July, 1835, was a native of Murato in Corsica, and was baptized there December 3, 1790. After following his father's occupation, that of a shepherd, he enlisted at the age of eighteen in the Corsican Legion at Naples, and passed with it into the service of Murat, King of Naples. In 1814 he returned to Corsica, and in the following year took part in the fatal expedition of Murat for the recovery of his crown. Sentence of death was passed on him and his companions, but it was not executed; and Fieschi once more returned to his native land. In 1816 he was convicted of theft and forgery, and was condemned to imprisonment for ten years. After his release he led for several years a restless miserable life, working only by fits, and eking out his resources by fraud and swindling. He went to Paris after the Revolution of July (1830), and by means of forged papers passed himself off as a victim of the Restoration, and obtained a pension and official employment. He affected a zealous devotion to the government, entered the police, and displayed much energy in the suppression of disturbances. But meanwhile his house was the scene of violent proceedings, and the neighborhood was kept in alarm by frequent noises, cries, and pistol-shots in

and around it. Facts were brought to light which cost him his friends and his employments. Exasperated by dismissal and the "ingratitude of the government," he vowed a terrible vengeance. He took lodgings on the Boulevard du Temple, and there, with several infamous confederates, contrived his "infernal machine," constructed with twenty gun barrels, to be fired simultaneously. In July, 1835, the fifth anniversary of the Revolution was to be celebrated. Vague rumors getting afloat of some impending catastrophe, of some horrible attempt on the life of the king, prudential measures were taken. On the 28th, as Louis Philippe was holding a grand review, and was passing along the boulevard accompanied by his three sons and a numerous staff, a sudden explosion was heard, followed by others, and the pavement was strewn with dead and wounded men. A ball grazed the king's forehead, and his horse, with those of the Duke of Nemours and the Prince de Joinville, was shot; but the king and the princes escaped as if by miracle. Fieschi himself was severely wounded by the discharge of his machine, and vainly attempted to escape. The attentions of the most skillful physicians were lavished upon him, and his life was saved for the stroke of justice. On his trial he named his accomplices, displayed much bravado, and expected or pretended to expect ultimate pardon. He was condemned to death, and was guillotined, February 19, 1836, making on the scaffold a premeditated theatrical display at the feet of his confessor. Of his accomplices two were executed, one was sentenced to twenty years imprisonment, and one was acquitted. A full account of the trial, *Procès de Fieschi*, appeared at Paris the same year.

FIESCO [DE' FIESCHI], GIOVANNI LUIGI, Count of Lavagna, Genoese conspirator, was descended from a great historical family, which counted among its members Popes Innocent IV. and Adrian V. He was born about 1523, and by the death of his father he became, at the age of twenty-three, the head of his race and the possessor of considerable estates. He had allied himself by marriage with the ancient family of Cibo—his wife Eleanora, then about twenty years of age, being a woman of high spirit, great beauty, and remarkable attainments. To the advantages of youth and wealth Fiesco added those of a fine figure, a handsome countenance, and fascinating manners. He was ambitious of power and high place, and inherited from his ancestors a strong passion of jealousy and hatred against the Doria family, the hatred of which, Andrea Doria, was then doge of the republic, while his nephew, the young Gianettino Doria, was commander of the galleys. With personal and family hostility was combined the political enmity between the imperial and French (aristocratic and popular) parties—the Dorias belonging to the former and being warmly supported by the nobles, while the Fieschi were of the latter and leaned upon the popular class. Bent on the overthrow of the doge and his family, Giovanni Luigi made an attempt to secure the support of Francis I. in his enterprise, but in this he did not at first succeed. The negotiations were afterward renewed through William du Bellay, then French ambassador in Italy, and an understanding was come to that the object of the proposed revolution should be to subject the republic to the king of France. The sanction of the pope, Paul III., was obtained, and the alliance of the Duke of Parma and Placentia secured. Associated with Giovanni Luigi in the conspiracy were his brothers Geronimo and Ottobuoni, and his trusted friends Vincenzo Calcagno, De Varese, and Raffaello Sacco. Troops were levied in the duchy of Parma, and report of these suspicious preparations was sent to Andrea Doria to put him on his guard. But his regard for



the young coant forbade him to entertain suspicion, and no precautions were taken. When all was ready, Fiesco invited the Dorias to a banquet at his place on the first day of January, 1547, purposing to assassinate them on their arrival. But the doge declined the invitation, his nephew Gianettino had to leave Genoa for some weeks, and the scheme thus foundered. The next night, however, taking advantage of the unsettled state of the city at the period of reëlection of the doge, Fiesco led out his band (having first by display of affectionate attention to Doria thrown him off his guard), seized the arsenal, and attacked the galleys. While passing along a plank from the quay to one of the galleys, the leader fell into the sea and was drowned, the darkness and the confusion preventing his cries for help being heard. The other conspirators proceeded with their task, and Gianettino was slain. The doge succeeded in making his escape, and after the dispersion of the troops and the flight of the leaders, he returned to Genoa, and was welcomed with extraordinary honors. Eleanora, wife of Fiesco, escaped to Massa, married again, survived her second husband many years, and died at Florence in 1594. The story of this conspiracy has frequently been told both by historians and by poets. Among the prose narratives that of Mascardi (Antwerp, 1629,) is commended for accuracy of detail, but is wanting in impartiality. Among the poems the most noteworthy is the tragedy of Schiller.

**FIESOLE**, a small episcopal city of Italy, occupying the site of the ancient Fæsulæ, on the crown of a hill that rises above the Arno, about three miles to the west of Florence. Population (1890), 4,000.

**FIESOLE**. Il Beato Fra Giovanni Angelico da Fiesole is the name given to a far-famed painter-friar of the Florentine state in the fifteenth century, the protagonist, beyond all other men, of pietistic painting. He is often, but not accurately, termed simply "Fiesole," which is merely the name of the town, noticed above, where he first took the vows; more often, Fra Angelico. If we turn his compound designation into English, it runs thus: "The Beatified Friar John, the Angelic of Fiesole." In his lifetime he was known, no doubt, simply as Fra Giovanni, or Friar John; "the Angelic" is a laudatory term which got assigned to him at an early date—we find it in use within thirty years after his death; and, at some period which is not defined in our authorities, he was beatified by due ecclesiastical process. His surname was Guido; his original Christian name—Giovanni being only his name in religion—is not known. He was born at Vicchio, in the Tuscan province of Mugello, of unknown but seemingly well-to-do parentage, in 1387 (not 1390, as sometimes stated); in 1407 he became a novice in the convent of S. Domenico at Fiesole, and, in 1408, he took the vows and entered the Dominican order. In or about 1445 he was invited by the pope to Rome. The pope who reigned from 1431 to 1447 was Eugenius IV., and he it was who, in 1445, appointed another Dominican friar, a colleague of Angelico, to be Archbishop of Florence. He died in 1455, and he lies buried in the Church of the Minerva.

**FIFE**. See **FLUTE**.

**FIFE**, a maritime, almost peninsular, Scottish county, washed on the north for twenty-one miles by the Firth of Tay, on the east for twenty-four miles by the German Ocean, and on the south for fifty-five miles by the Firth of Forth. Its extreme length is forty-two miles, its extreme breadth is twenty-one miles, and its area 513 square miles. The surface offers a succession of cultivated hills, the most prominent eminences being the East and West Lomonds (1471 and 1713

feet), Largo Law (965), and Burnt Island Bin (632). Almost the only streams are the Eden (thirty miles long), and the Leven (16 miles long); whilst of seven lakelets the chief are Kilconquhar Loch (four by three furlongs), and Lindores Loch (seven by three furlongs). Fife rests on the Old Red Sandstone, with trap rocks in the north, carboniferous strata and trap in the south. Its mineral wealth includes coal (which is largely mined), shale, ironstone, limestone and free-stone. The soil is some of it very fertile, especially in the Howe of Fife, or Stratheden; and whilst barely one-fourth of the whole of Scotland is in cultivation, in Fife the proportion is nearly three-fourths. One-seventeenth is under wood. "A gray cloth mantle with a golden fringe," said James VI. of Fife, referring to the many towns and fishing villages that skirt its ancient sea-margin—Inverkeithing, Burnt Island, Kinghorn, Kirkcaldy, Dysart, Leven, Largo, Elie, St. Monans, Pittenweem, the Anstruthers, Kilrenny, Crail, St. Andrews, Ferryport, Newport, and Newburg. Inland lie Cupar, Dunfermline, Falkland, Lochgelly, etc. Under these towns are noticed the manufactures, the chief antiquities, the illustrious natives, and the outstanding points in the peaceful history of the "Kingdom of Fife" which took so leading a part in the Scottish Reformation. Here, then, we need mention only the fine Romanesque church of Leuchars; the ruined abbeys of Balmerino and Lindores; Magus Muir, the scene of Sharp's murder; Cults, the birthplace of Wilkie; and Balcarres, of Lady Ann Barnard. Fife returns two members to parliament. It is seventeenth in size among Scottish counties, but fifth in rental, seventh in population—(1801) 93,743; (1841) 140,140; (1881) 174,931, of whom only 39,209 were rural. See Sir Robert Sibbald's *History of Fife* (1710), A. H. Millar's *Castles and Mansions of Fife* (1889). Fife Ness, the eastmost point of Fife, is a low headland. A mile northeast in the sea is the dangerous Carr Reef, where a light ship was moored in 1866. The county has since 1759 given the title of Earl of Fife to the family of Duff.

**FIFTH MONARCHY MEN**, a Puritan sect who supported Cromwell's government in the expectation that it was a preparation for the "fifth monarchy"—that is, the monarchy which should succeed the Assyrian, the Persian, the Grecian and the Roman, and during which Christ should reign with his saints on earth for a thousand years.

**FIG**, the popular name given to plants of the genus *Ficus*, an extensive group, included in the natural order *Moraceæ*, and characterized by a remarkable development of the pear-shaped receptacle, the edge of which curves inward, so as to form a nearly closed cavity, bearing the numerous fertile and sterile flowers mingled on its surface. See **BOTANY**.

**FIGARO**, a famous dramatic character first introduced on the stage by Beaumarchais in the *Barbier de Seville*, the *Mariage de Figaro*, and the *Folle Journée*. The name is said to be an old Spanish and Italian word for a wigmaker, connected with the verb *cigarrar*, to roll in paper. Many of the traits of the character are to be found in the earlier comic types of the stage.

**FIGEAC**, a town of France, capital of an arrondissement in the department of Lot, is situated on the right bank of the Selle. Population, 6,000.

**FIGUERAS**, a frontier town of Spain in the province of Gerona, and twenty miles west-northwest of the town of that name. Population (1890), 10,000.

**FIJI ISLANDS**. The Fiji, or more correctly Viti,



archipelago (Fiji being the pronunciation in the eastern part of the group frequented by the Tongans) is one of the most important in the South Pacific. Its nearest neighbors are the Samoan group 300 miles to the northeast, and the Tongan or Friendly rather nearer to the southeast. From April to November the winds are steady between southeast and east-northeast, after which the weather becomes uncertain and the winds often northerly. In February and March heavy gales are frequent, and hurricanes sometimes occur, causing scarcity by destroying the crops. The rainfall is much greater on the windward than on the lee sides of the islands (108 inches at Levuka), but the mean temperature is much the same, viz., about 80° F. The greatest rise and fall of the tide is six feet. The islands cover an area of some 7,400 square miles, or about that of Wales. Excluding the two large islands, they are classed by the natives in three groups, viz., the "Lau" or Windward Islands, mostly small, but many of them very fertile, of which Lakemba is the most important; "Loma-i-Viti," or Inner Fiji, *i.e.*, the islands inclosed between the Lau and the two great islands Viti Levu (Great Viti) and Vanua Levu (Great Land); and the "Ra" or Leeward Islands, a chain of numerous small islands bounding the group to the westward.

The islands number about 250, of which perhaps eighty are inhabited. Viti Levu, about eighty by fifty-five miles is the largest and most important from its fertility and variety of surface, number of large rivers, and population—which is about one-third of that of the whole group. Vanua Levu, somewhat smaller, about 100 by 25 miles, and less fertile and populous, has good anchorage along its entire south coast. All the others are much smaller. Taviuni, twenty-five by five miles, with a central ridge 2,100 feet high and a lake at the top, is fertile, but exceptionally devoid of harbors. Kandavu, twenty-five miles long and very narrow, well-timbered, with a good harbor, contains a Wesleyan training institution and model village. Fulanga and Kambara are well-timbered and frequented by canoe-builders. Totoya, Moala, Ngau, Mbengga, Nairai, Koro, are all valuable islands (the last especially fertile), fifteen to thirty miles in circumference. The Wilson or Exploring group consists of seven islands of considerable size, well situated for the resort of vessels, with anchorages safe and easily reached, and supplies abundant. The navigation between the islands is in many places intricate, but the dangers can be much lessened by good surveys, careful pilotage, and increased use of steam. There are good anchorages inside the barrier reef; the best harbors are those of Suva in Viti Levu, Savu-Savu and Mbua or Sandalwood Bays in Vanua Levu, Galoa Bay in Kandavu, and Levuka.

The vegetation is mostly of a tropical Indo-Malayan character—thick jungle with great trees covered with creepers and epiphytes. The lee sides of the larger islands, however, have grassy plains suitable for grazing, with scattered trees, chiefly *Pandanus*, and ferns. The flora has also some Australian and New Zealand affinities (resembling in this respect the New Caledonia and new Hebrides groups), shown especially in these western districts by the *Pandanus*, by certain acacias, epacrids, *Casuarina*, and *Dammara*, and by the peculiar habit of other species. At about 2,000 feet the vegetation assumes a more mountain type.

Among the many valuable timber trees are the vesii; the dilo, the oil from its seeds being much used in the islands, as in India, in the treatment of rheumatism; the dakua allied to the New Zealand kauri; the vaivai, the *Casuarina*, and others, chiefly conifers, Guttiferæ, Myrtaceæ, and Leguminosæ. Most of the fruit trees are also valuable as timber. The native cloth (masi) is

beaten out from the bark of the paper mulberry, cultivated for the purpose. Several useful fibers are supplied by plants of the Musaceæ Bromelideæ, Thymeleæ, and other orders. Of the palms the cocoa-nut is by far the most important. Dr. Seemann discovered a sago-palm known to the natives by the name of sogu, though they were then ignorant of its use. The yasi or sandalwood is now rarely found, and only in a small district at the western extremity of Vanua Levu. There are various useful drugs, spices, and perfumes; and many plants are cultivated for their beauty, to which the natives are keenly alive. Among the plants used as pot-herbs are several ferns, and two or three Solanums, one of which, *S. anthropophagorum*, allied to our *S. nigrum*, was one of certain plants always cooked with human flesh, which is said to be otherwise difficult of digestion. The use of the kava root, here called yanggona, from which the well-known national beverage is made, was introduced, it is said, from Tonga.

Of fruit-trees, besides the cocoa-nut, we can only mention the many varieties of the bread-fruit, of bananas and plantains, of sugar-cane and of *Citrus*; the wi, the kavika, the ivi or Tahitian chestnut, the pineapple, and others recently introduced. Edible roots are especially abundant. The chief staple of life is the yam, the names of several months in the calendar having reference to its cultivation and ripening. The *Dioscorea alata* is the variety chiefly planted; its roots are sometimes 8 feet long and 100 lb. in weight. The kawai is also a very fine esculent, and there are several wild species. The yaka, which also grows wild, is a papilionaceous creeper, with roots 6 to 8 feet long and as thick as a man's thigh; it is also much valued for its fiber. The taro or dalo is grown in ditches, by streams, or on irrigated ground; and there are other aroideous plants growing wild, with huge edible corms.

The islands are well suited to sugar, maize, coffee, cotton (which here becomes a perennial several feet high), tobacco, manilla, india-rubber, etc.

The Fijian character was till lately proverbial for every savage abomination. Cannibalism, if fenced round at one time by religious sanctions, had degenerated to a morbid craving recklessly indulged whenever possible. Shipwrecked or helpless strangers were nearly always killed and eaten. Widows were strangled at the death of their husbands, slaves killed at the death of their masters; victims were slain in numbers at the building of a house or of a canoe, or at the visits of embassies from other tribes. The lives of individuals were always subject to the caprices of the chiefs. In the atmosphere of suspicion and treachery thus engendered few virtues could be developed. Yet the people were always hospitable, open-handed, and remarkably polite. They themselves attribute to affection the practice of killing their sick or aged relations. They are sensitive, proud, vindictive, boastful, cleanly in their houses, cookery, etc., with good conversational and reasoning powers, much sense of humor, tact, and perception of character. Their code of social etiquette is minute and elaborate, and the gradations of rank well-marked. The population forty years ago was about 200,000, it has since rapidly diminished, owing at first to the evils above described (aggravated probably by contact with the vicious European element), and afterward to that fatal languor which so often accompanies the introduction of civilization, the deaths now outnumbering the births.

FILANGIERI, CARLO, an Italian general, son of the economist Gaetano Filangieri, was born at Naples in 1783, not long before his father's death. In 1799 he came to France, and, through the influence of the first consul, was admitted to the prytanée, then the training



school for young officers, where he remained for the usual period of two years. Entering the French army, he was promoted to the rank of captain on the field of Austerlitz. He afterward connected himself with the Neapolitan army, which he accompanied to Spain (1808), where he distinguished himself by a brilliant, though not always considerate, valor. He fought many duels, one with General Franceschi, whom he killed. In 1815 he was created general by Murat, and decorated with the order of the Deux-Siciles, after being severely wounded by the Austrians while reconnoitring on the Tanaro. On the restoration of the Bourbons to the throne of Naples, Filangieri opposed the constitution of 1820, and showed himself a most decided partisan of absolute power. He, however, incurred the displeasure of Ferdinand I.; but on the accession of Ferdinand II., he was placed at the head of the artillery and engineers. In 1848 he powerfully helped to check the revolutionary movement, by taking Messina after a terrible bombardment which lasted four days; and six months after, when the armistice imposed by England and France expired, he completed the submission of Sicily, of which he was appointed governor-general with dictatorial powers. As a reward for his services he received the title of Duke of Taormina. He died in 1867.

FILANGIERI, GAETANO, an eminent Italian publicist, was born at Naples on August 18, 1752. He was the third son of Cæsar, Prince of Arianiello, and through his mother he was connected with the ducal house of Fragnito. Gaetano was from his infancy destined for the profession of arms; when only seven years of age he received a military appointment, and at fourteen he began actual service.

In the year 1774, King Charles III. of Naples, at the instance of his minister Tanucci, had issued a much-needed ordinance for the reform of abuses in the administration of justice. Although this reform had been generally welcomed, it had excited the murmurs of the bar. Filangieri became the advocate of the court, and published a defense of the royal decree founded upon the most enlarged views of law and equity. The extensive knowledge and matured judgment displayed in this performance called forth the warm commendation of Tanucci, who encouraged its author to pursue the course in which he had already acquired so much distinction. Through this influence and that of his uncle, the archbishop of Palermo, he received, in 1777, several honorable appointments at court; but his residence there neither broke in upon his regular habits of life, nor interrupted the course of his studies; nor did he allow it to interfere with the composition of the great work, *La Scienza della Legislazione*, on which he was engaged, and to which, rather than to practice at the bar, he had all along been devoting his chief attention. The first and second books, containing respectively an exposition of the rules on which legislation in general ought to proceed, and a discussion of political and economic laws in particular, appeared at Naples, 1780. Its success was great and immediate. Not only in Italy, but throughout Europe at large, the author forthwith took rank with the most celebrated publicists—with his own countrymen Gravina, Vico, and Beccaria, and with the illustrious Montesquieu. Although in the course of his observations he had found it necessary to point out many faults committed by his own government, so skillfully had he discharged the delicate task of stating obnoxious truths without giving offense to those in power that he was promoted by the king to a commandery in the royal order of Constantine. In 1783 he was married to Caroline von Frendel, an Hungarian lady; and in order that he might the more fully enjoy domestic happiness, and at

the same time have leisure for the composition of his work, on which he became every day more intent, he, with the consent of the king, resigned all his military appointments and his offices at court, and retired to a country seat at Cava, some twenty miles from Naples. In the same year he published the third book of his *Scienza*, relating entirely to the principles of criminal jurisprudence. Even his earlier volumes had not failed to rouse the antipathies of an interested and influential class; but in this certain suggestions which he had made as to the need for reform in the Roman Catholic Church called forth the censure of the ecclesiastical tribunals, and his book was condemned by the congregation of the Index in 1784. In the following year he nevertheless published three additional volumes, dealing with education and morals, these forming the fourth book of his great work. He was proceeding with the preparation of the remaining three books, but his health was now considerably impaired, owing to an excess of application, so that composition advanced but slowly; and other interruptions soon followed. In 1787 the new king, Ferdinand IV., summoned him to Naples to assist in the council of finance; and there for a time he was wholly engrossed with this important public business. But severe domestic misfortunes, combined with over-work, soon compelled his withdrawal from office once more. He had just finished the first part of his fifth book, in which he treats of the different systems of religion which preceded Christianity, when he died on July 21, 1788.

FILBERT. See HAZEL.

FILE, a bar of steel having sharp teeth on its surface, and used for abrading or smoothing hard substances. Some uncivilized tribes polish their weapons with such things as rough stones, pieces of shark skin, or fishes' teeth. According to the form of their teeth, files may be *single-cut* or *double-cut*; the former only have one set of parallel ridges (either at right angles or at some other angle with the length); the latter (and more common) have a second set cut at an angle with the first. The double-cut file presents sharp angles to the filed surface, and is better suited for hard metals. Files are also classed according to fineness of teeth, being known (in order of increasing fineness) as *rough*, *bastard*, *second-cut*, *smooth*, and *superfine* or *dead smooth*. The shapes of files present almost endless varieties. Common forms are—the *flat* file, of parallelogram section, with uniform breadth and thickness, or tapering, or "bellied"; the *four-square* file, of square section, sometimes with one side "safe," or left smooth; the so-called *three-square* file, having its cross section an equilateral triangle, the *half-round* file, a segment of a circle, the *round* or *rat-tail* file, a circle; these are generally tapered. The *float* is like the *flat*, but single-cut. There are many others. Files vary in length from three-quarters of an inch (watchmakers') to two or three feet and upward (engineers'). The length is reckoned exclusively of the spike or tang which enters the handle. Most files are tapered; the *blunt* are nearly parallel, with larger section near the middle; a few are parallel. The *rifflers* of sculptors and a few other files are curvilinear in their central line.

FILE-FISH and TRIGGER-FISH are names given to fishes of the genus *Balistes* inhabiting all tropical and subtropical seas. Their body is compressed and not covered with ordinary scales, but with small juxtaposed scutes. Their other principal characteristics consist in the structure of their first dorsal fin (which consists of three spines) and in their peculiar dentition. The first of the three dorsal spines is very strong, roughened in front like a file, and hollowed out behind to receive the second much smaller spine, which, besides, has a pro-



jection in front, at its base, fitting into a notch of the first. Thus these two spines can only be raised or depressed simultaneously, in such a manner that the first cannot be forced down unless the second has been previously depressed. The latter has been compared to a trigger, hence the name of *Trigger-fish*.

FILELFO, FRANCESCO, was born in 1398 at Tolentino, in the March of Ancona. When he appeared upon the scene of human life, Petrarch and the students of Florence had already brought the first act in the recovery of classic culture to conclusion. They had created an eager appetite for the antique, had disinterred many important Roman authors, and had freed Latin scholarship to some extent from the barbarism of the Middle Ages. Filelfo was destined to carry on this work in the field of Latin literature, and to be an important agent in the still unaccomplished recovery of Greek culture. His earliest studies in grammar, rhetoric, and the Latin language were conducted at Padua, where he acquired so great a reputation for learning that in 1417 he was invited to teach eloquence and moral philosophy at Venice. According to the custom of that age in Italy, it now became his duty to explain the language, and to illustrate the beauties of the principal Latin authors, Cicero and Virgil being considered the chief masters of moral science and of elegant diction. Filelfo made his mark at once in Venice. He was admitted to the society of the first scholars and the most eminent nobles of that city; and in 1419 he received an appointment from the state, which enabled him to reside as secretary to the consul-general of the Venetians in Constantinople. This appointment was not only honorable to Filelfo as a man of trust and general ability, but it also gave him the opportunity of acquiring the most coveted of all possessions at that moment for a scholar—a knowledge of the Greek language. Immediately after his arrival in Constantinople, Filelfo placed himself under the tuition of John Chrysoloras, whose name was already well-known in Italy as brother of Manuel, the first Greek to profess the literature of his ancestors in Florence. At the recommendation of Chrysoloras he was employed in several diplomatic missions by the emperor John Palæologus. Before very long the friendship between Filelfo and his tutor was cemented by the marriage of the former to Theodora, the daughter of John Chrysoloras. He had now acquired a thorough knowledge of the Greek language, and had formed a large collection of Greek manuscripts. There was no reason why he should not return to his native country. Accordingly, in 1427 he accepted an invitation from the republic of Venice, and set sail for Italy, intending to resume his professional career. From this time forward until the date of his death, Filelfo's history consists of a record of the various towns in which he lectured, the masters whom he served, the books he wrote, the authors he illustrated, the friendships he contracted, and the wars he waged with rival scholars. He was a man of vast physical energy, of inexhaustible mental activity, of quick passions, and violent appetites; vain, restless, greedy of gold and pleasure and fame; unable to stay quiet in one place, and perpetually engaged in quarrels with his compeers.

Filelfo deserves commemoration among the greatest humanists of the Italian Renaissance, not for the beauty of his style, not for the elevation of his genius, not for the accuracy of his learning, but for his energy, and for his complete adaptation to the times in which he lived. His erudition was large but ill-digested; his knowledge of the ancient authors, if extensive, was superficial; his style was vulgar; he had no brilliancy of imagination, no pungency of epigram, no grandeur of rhetoric. Therefore he has left nothing to posterity which the

world would not very willingly let die. But in his own days he did excellent service to learning by his untiring activity, and by the facility with which he used his stores of knowledge. It was an age of accumulation and preparation, when the world was still amassing and cataloguing the fragments rescued from the wrecks of Greece and Rome. Men had to receive the very rudiments of culture before they could appreciate its niceties. And in this work of collection and instruction Filelfo excelled, passing rapidly from place to place, stirring up the zeal for learning by the passion of his own enthusiastic temperament, and acting as a pioneer for men like Poliziano and Erasmus.

FILIBUSTER, a name first given to the buccaneers, a band of piratical adventurers who maintained themselves chiefly in the Carribbean Seas during the seventeenth century (see BUCCANEER).

FILICAIA, VINCENZO DA, sprung from an ancient and noble family of Florence, was born in that city December 30, 1642. From an incidental notice in one of his letters, stating the amount of house rent paid during his childhood, his parents must have been in easy circumstances, and the supposition is confirmed by the fact that he enjoyed all the advantages of a liberal education, first under the Jesuits of Florence, and then in the University of Pisa. At Pisa his mind became stored, not only with the results of patient study in various branches of letters, but with the great historical associations linked with the former glory of the Pisan Republic, and with one remarkable institution of which Pisa was the seat. To the tourist who now visits Pisa the banners and emblems of the order of St. Stephen are mere matter of curiosity, but they had a serious significance two hundred years ago to the young Tuscan, who knew that these naval crusaders formed the main defense of his country and commerce against the Turkish, Algerine, and Tunisian Corsairs. After a five years' residence in Pisa he returned to Florence, where he married Anna, daughter of the Senator and Marquis Scipione Capponi, and withdrew to a small villa at Figline, not far from the city. Abjuring the thought of writing amatory poetry, in consequence of the premature death of a young lady to whom he had been attached, he occupied himself chiefly with literary pursuits, above all the composition of Italian and Latin poetry. His own literary eminence, the opportunities enjoyed by him as a member of the celebrated Academy Della Crusca for making known his critical taste and classical knowledge, and the social relations within the reach of a noble Florentine so closely allied with the great house of Capponi, sufficiently explain the intimate terms on which he stood with such eminent men of letters, as Magalotti, Menzini, Gori, and Redi. The last-named, the author of *Bacchus in Tuscany*, was not only one of the most brilliant poets of his time, and a safe literary adviser; he was the court physician, and his court influence was employed with zeal and effect in his friend's favor. Filicaia's rural seclusion was owing even more to his straitened means than to his rural tastes. If he ceased at length to pine in obscurity, the change was owing not merely to the fact that his poetical genius, fired by the deliverance of Vienna from the Turks in 1683, poured forth the right strains at the right time, but also to the influence of Redi, who not only laid Filicaia's verses before his own sovereign, but had them transmitted, with the least possible delay, to the foreign princes whose noble deeds they sung. The first recompense came, however, not from those princes, but from Christiana, the ex-Queen of Sweden, who, from her circle of savants and courtiers at Rome, spontaneously and generously announced to Filicaia her wish to bear the expense of educating his two sons, enhancing her kindness by the



delicate request that it should remain a secret. And now the tide of Filicaia's fortunes turned. The Grand-Duke of Tuscany, Cosmo III., conferred on him an important office, the commissionership of official balloting. He was named governor of Volterra in 1696, where he strenuously exerted himself to raise the tone of public morality. Both there and at Pisa, where he was subsequently governor in 1700, his popularity was so great that, on his removal, the inhabitants of both cities petitioned for his recall. He passed the close of his life at Florence; the grand-duke raised him to the rank of senator, and he died in that city on September 24, 1707.

**FILIGREE**, formerly written filigrain or filigrane, jewel work of a delicate kind made with threads and beads usually of gold and silver. The compound word from the Latin *filum*, thread, and *granum*, grain, is not found in Ducange, and is indeed of modern origin. Though filigree has become a special branch of jewel work in modern times it was anciently part of the ordinary work of the jeweler. Signor Castellani states, in his lecture on "Antique Jewellery," that all the jewelry of the Etruscans and Greeks was made by soldering together wires and grains or minute plates of gold rather than by hammering or stamping the precious metals in dies.

The art may be said to consist in curling, twisting, and plaiting fine pliable threads of metal, and uniting them at their points of contact with gold or silver solder and borax, by the help of the blow-pipe. Small grains or beads of the same metals are often set in the eyes of volutes, on the junctions, or at intervals at which they will set off the wire work effectively. The more delicate work is generally protected by framework of stouter wire. Brooches, crosses, earrings, and other personal ornaments of modern filigree are generally surrounded and subdivided by bands of square or flat metal, giving consistency to the filling up, which would not otherwise keep its proper shape.

**FILIPPINO**. See **LIPPI**.

**FILLAN**, St. The accounts given by various writers of this saint, in so far as they supply any details, are, as in many similar cases, purely legendary and conjectural. That such an ecclesiastic existed, that he was of Irish origin, and that he was venerated in Glendochart and Strathfillan in Perthshire as early as the eighth or ninth century, may be held as certain.

**FILLMORE**, **MILLARD**, thirteenth president of the United States of America. His family was of English stock, and had early settled in New England. His father, Nathaniel Fillmore, made in 1795 a clearing within the limits of what is now the town of Summer Hill, Cayuga County, New York, and there the future president was born, January 7, 1800. The father went by the title of "the squire," and served as a justice in the beginnings of the settlements nearest to him, which were very sparsely occupied. Millard, to the age of fourteen, could have shared only the simplest rudiments of education, chiefly from his parents, with slight help from a school. At that age he was apprenticed for the usual term to a fuller and clothier, to card wool, and to dye and dress the cloth from the farmers' houses. Two years before the close of his term, he, by a promissory note for thirty dollars, bought the remainder of his time from his master, and entered a retired lawyer's office as a student and helper at the age of nineteen. He, of course, received and accepted the usual honor extended to young men of his proclivities, to deliver the Fourth of July oration, before he was twenty-one years of age. In 1820 he made his way to Buffalo—then only the germ of the present flourishing city—and supported himself

as a student in another law office by teaching a school and aiding the postmaster. In 1823 he was admitted an attorney in the court of common pleas, Erie county, and then took up legal practice in Aurora, to which his father had removed. Hard study, temperance, and integrity gave him a good reputation, and moderate success, and he was made an attorney and counselor of the supreme court of the State. In 1826 he married Abigail, daughter of the Rev. Lemuel Powers. Returning to Buffalo in 1830 he formed a partnership with two lawyers, both afterward distinguished in public life, and became successful at the bar. From 1828 to 1831 he served as a representative in the State Legislature, coming in as an anti-mason. In the single term of 1832-4 he was representative of his district in the national Congress, as anti-Jackson, or, in opposition to the administration. From 1836 to 1842, when he declined further service, he represented his district as a member of the Whig party. In Congress he opposed the annexation of Texas as slave territory, was a warm advocate of internal improvements and a protective tariff, supported J. Q. Adams in maintaining the right of offering anti-slavery petitions, advocated the prohibition by Congress of the slave traffic between the States, and favored the exclusion of slavery from the District of Columbia. His speech and tone, however, were moderate on these exciting subjects, and he claimed the right to stand free of pledges, and to adjust his opinions and his discourse by the development of circumstances. The Whigs having the ascendancy in Congress during the latter part of his membership, he was made chairman of the House Committee of Ways and Means. Against a strong opposition he carried an appropriation of \$30,000 for Morse's telegraph, and secured important provisions in the new tariff measures of 1842. He found some supporters of his proposed nomination as a candidate for vice-president in the Whig National Convention at Baltimore. In May, 1844, being the Whig candidate for the governorship of New York, he was defeated by Silas Wright. In 1847 he was made comptroller of the State of New York, an office of manifold responsibilities and duties, which he resigned on his election, in November, 1848, as vice-president of the United States, Zachary Taylor being president. He presided over the Senate ably and impartially during the seven months of exciting debate and agitation on the so-called "Compromise Measures," and Mr. Clay's "Omnibus Bill," which, though finally defeated as a whole, substantially succeeded in its general bearing on several matters of intense import to the nation as connected with the subject of slavery.

President Taylor died July 9, 1850, and the next day Fillmore, according to the special provision of the constitution, took the oath and acceded to the highest office, being then fifty-one years old. The cabinet which he called around him, contained many distinguished men, as Webster, Corwin, Crittenden, Graham, Hall, and Kennedy. On the death of Webster in 1852, Edward Everett succeeded him as secretary of state. The president sent a force to protect New Mexico in the dispute as to its boundaries with Texas. The critical matter which gave its historic significance to his administration was that chief one of the class of "compromise" measures, the enactment of the Fugitive Slave Law, to make effective a provision of the constitution for the rendition of "fugitives from labor or service." Being instructed by Crittenden, his attorney-general, that the bill was not inconsistent with the constitutional sanction of the Habeas Corpus, the president signed the bill, and issued a proclamation calling upon government officials to enforce it. These measures roused the most passionate opposition and animosity among Whigs as well as anti-



slavery men. The attempt to enforce the odious law was restricted by mobs in various free States, and was made, for the most part, wholly ineffectual, the people being resolved to regard it as annulled by the "higher law." The fact that the president had signed and sought to enforce the law, though he might plead for himself constitutional obligation, and a purpose of patriotic fidelity in the exercise of his best judgment, made a breach between him and his party. But few questioned the sincerity and purity of his intentions, or his own full persuasion that the measures were of vital necessity to pacify the nation. Still, as the result was a sharp and embittered variance among his previous supporters, his administration was regarded as inglorious, if not as a failure. In many other matters of high public concern, his official course, as indicated by his appointments, the recommendations in his messages, and the projects which he devised, was characterized by sound discretion, by humane promptings, and practical wisdom. His advice, however, on these matters, was not always followed by Congress. That body having approved a plan for the extension of the Capitol, the president, on July 4, 1851, laid the corner-stone of the new edifice, Daniel Webster being the orator of the occasion. In the same year Fillmore interposed promptly in thwarting the projects of the "filibusters," under Lopez, for the invasion of Cuba. Commodore Perry's expedition to Japan, that of Lieutenant Lynch to Africa, and that of Ringgold to the Chinese Seas, with the exploration of the valley of the Amazon by Herndon and Gibbon, may be referred to as engaging the executive ability and wide forethought of the president. His term closed March 4, 1853. In the preceding autumn he had been an unsuccessful candidate for nomination for the presidency by the Whig National Convention, and he yielded his place to Franklin Pierce. Three weeks before the close of his term his wife died in Washington, and he quietly returned, with a son and a daughter, to private life in Buffalo. In 1854 he traveled extensively through the Southern and Western States, and in 1855-6 he visited Europe, moving from place to place in a quiet and unostentatious way, but receiving much courteous attention. He declined the proffered honor of D.C.L. from Oxford. While in Rome he was informed of his nomination for the presidency by the "Native American" party, the nominees of the other parties being Buchanan and Fremont. In 1858 he married Mrs. Caroline McIntosh of Albany, a lady of fortune and culture. Retiring to his home in Buffalo, he enjoyed a studious retirement among his books and friends, taking no public share in political affairs. He took great interest in the Buffalo Historical Society, of which he was the president. His life closed March 8, 1874, in his seventy-fifth year. All who knew him in any relation accorded in regarding him as an upright and conscientious man, blameless, loving simple ways, and heartily devoted to the best interests of his country.

FILM. See CAPILLARY ACTION.

FILMER, SIR ROBERT, a writer of the seventeenth century, remarkable for his singular political theory, which deserves notice on account of the great attention which it excited, was the son of Sir Edward Filmer of East Sutton in Kent. He studied at Trinity College, Cambridge, where he matriculated in 1604. His death has been fixed at widely different dates, but of these the most probable is 1653. Filmer was already a middle-aged man when the great controversy between the king and the commons roused him into literary activity. His writings afforded an exceedingly curious example of the doctrines held by the most extreme section of the Divine Right party. Filmer's theory is founded upon the statement that the government of a family by the father is the

true original and model of all government. In the beginning of the world God gave authority to Adam, who had complete control over his descendants, even as to life and death. From Adam this authority was inherited by Noah, and Filmer quotes as not unlikely the tradition that Noah sailed up the Mediterranean and allotted the three continents of the Old World to the rule of his three sons. From Shem, Hem, and Japheth the patriarchs inherited the absolute power which they exercised over their families and servants, and from the patriarchs all kings and governors (whether a single monarch or a governing assembly) derive their authority, which is therefore absolute, and founded upon divine right.

FILTER, an arrangement for the separation of impurities from liquids, by passing through porous material. The filtering process is common in nature. The clearness of spring water is due to it, for such water generally comes from a considerable depth in the ground, and having traversed a variety of porous strata, it has undergone a straining action, producing the beautiful transparency we observe. This does not, of course, represent absolute purity, for the liquid retains in solution various substances acquired by contact with the strata through which it has percolated. The operation of filtration is extensively practiced in purification of water, on a large scale for supply of towns and cities, and on a small scale for domestic purposes, and for the use of ships on a long voyage, etc. It is also a valued method in chemistry and the arts.

FINALE DELL' EMILIA, a town of Italy, circle of Mirandola, province of Modena, is situated on the right bank of the Panaro, ten miles from its junction with the Po. Population (1890), 5,000.

FINANCE. In the thirteenth and fourteenth centuries, the words *finare*, *finacio*, and *financia* were employed, principally by writers in France, to denote those bargains by which the indefinite liabilities of ancient tenures were commuted for fixed sums payable to the immediate lord of the tenant. It was at this time that the commutation became general, except when the service of the tenant was of a military or dignified character. Even here, however, a remarkable innovation was made at an early period in English social history, and the system finally was abolished. In course of time the word finance became nearly synonymous with the product of taxation, and the finances of a country (though the phrase is sometimes used to denote the aggregate revenues of those who are liable to taxation) are understood to be the ways and means by which the expenditure of government, imperial and local, are met. In the present article we shall deal with the history of finance only. Under the head of TAXATION, the reader will find an analysis of the economical theory, in accordance with which taxation is shown to be innocuous and equitable, or the reverse.

The most ancient forms of finance have always been taxes on produce. Such appear to have been the taxes of ancient Egypt; such were and still are the principal taxes of Turkey and Hindustan. Whatever may have been the character of the first agricultural settlement, the development of a central government has always been assisted by a theory that the true lordship of the soil is the property of the state or the ruler, on which the immediate occupant of the soil is dependent, and to which a portion of the produce is due. The conquests of Rome always involved a confiscation of the vanquished nation's land, and the re-grant of a portion of the confiscated estate on what we might call by analogy a base tenure. In the same way, when in the tenth and eleventh centuries the Christianized Teutonic tribes of northeastern Europe pressed on the heathen Slavs, the victory of the former was always followed by the establishment of a



military and well-endowed church, on which a third of the conquered territory was generally settled, the vanquished race being permitted, though in a state of dependence, to occupy the residue. The settlement of Ægina and Eubœa by the Athenian lot-holders, to say nothing of more ancient occupancies, was of the same character. Here indeed the state distributed the ownership which it had acquired by its arms among its citizens, though doubtless it claimed military service from them as a garrison, and probably exacted a revenue which was similar in its nature to a rent.

The financial system of ancient states was, as a rule, exceedingly simple. The charges of government were few, except in the vast despotisms of Asia and Egypt, and later on in the great military republics of Carthage and Rome, where the revenues of the king and state were derived from tribute in money or kind from inferior or dependent districts and races. The district of the Aristotelian ideal city is to be divided into two portions, one the property of the state, out of the produce of which the charges of the national religion and the costs of the common tables are to be supplied, the other to be held in private ownership. The philosopher does not contemplate the necessity of making provision for the ordinary charges of government. The magistrates were unpaid; the army was a militia, serving at its own charges. When the Lacedæmonians undertook the command of the allies in the Peloponnesian war, they had no public revenue. Later on in their history, we are told by Aristotle that the public exchequer of the Lacedæmonians was ill managed, for most of the land of Laconia belonged to the Spartiats, and they assessed themselves.

The beginning of Athenian finance was a revenue derived from the silver mines in the promontory of Sunium, the ownership of which was, it seems, vested in the state. It was the practice of the Athenian Government to grant a perpetual lease of allotments in these mines, and to exact, moreover, a small percentage on the produce, reserving to itself a right of forfeiture and reëntry if the terms of the lease were infringed, or the produce rents were unpaid. With the proceeds of these mines the Athenians built their first navy, and with this navy they won the victory of Salamis, thus paving the way to their naval supremacy.

The next great source of Athenian revenue was the contribution from those protected states which failed to supply a proper naval contingent for the defense of the Ægean. Most of the Greek cities of Asia Minor and the islands owed their security from the attacks of the Phœnician navy, then dependent on Persia, to the vigorous and effective sea forces of the Athenian republic. It was cheaper for them to commute their contingent for a money payment, and the police of the sea became far more efficient when wielded by a single power, which had every interest in bringing its navy to the highest pitch of serviceableness. The Athenians contrived to economize, and, later on, to increase the contributions of those states whom they protected. Considering that they had fully satisfied the terms of their own bargain if they thrust back the Persian despot, they concluded that they might fairly accumulate a surplus in the public treasury, and even expend a portion of their revenues in embellishing their city.

We may be certain that the power which this revenue gave the Athenian republic was the chief cause of that jealous fear which precipitated the thirty years' war of the fifth century B.C., and which produced results as disastrous to the progress of mankind as a war of the same duration twenty centuries later did on the rapidly growing civilization of central Europe. So desperate and so penniless were the military rivals of Athens,

overwhelming as their land forces were, that they even thought of appropriating the sacred treasures of Delphi, a proposal, in the fifth century before Christ, which was as shocking as it would have been in the twelfth century after Christ to have suggested that the sacred vessels and shrines of the great churches and monasteries should be coined in order to pay the soldiers of the crusade.

The finance of antiquity derived a revenue from customs. These customs were, at least in Athens, an *ad valorem* duty of 2 per cent as a war measure. Twelve years before the conclusion of the great thirty years' struggle, the Athenians levied a 5 per cent *ad valorem* duty on their subject cities, though this was in substitution for the old contribution on account of the police of the seas. A poll tax was levied on foreign residents, perhaps on slaves; and it appears that, possibly as a measure of police, another poll tax was imposed on the inmates of disreputable houses.

The revenue, therefore of that Greek state whose history is best known to us was derived from the rent of public lands, especially the mines, from a composition paid by the allies in lieu of naval service, from very moderate custom duties, and from a few personal taxes. It must not, however, be imagined that the finance of antiquity was successful in the eyes of those who saw how inelastic it was. There is still extant a treatise by a very practical man. Xenophon, in the oldest work on finance, discusses the means by which the Athenian home revenue might be conveniently increased, and, like many other speculative thinkers, suggest projects which would have created far more mischief than they would have remedied. It will be obvious also that by far the most important item in Athenian finance, the contributions from the allies in lieu of personal service, was necessarily precarious, and that when the Athenian empire was finally broken up, the revenue of the state was gone, while the necessity of finding ways and means for the public defense was as urgent as ever.

The revenue of Rome in the earlier ages of the republic was derived from the lands of the state, payments in kind or money from subjects, from import and export duties, and a few taxes on products and articles of luxury. Partly as compensation for the loss of the national domain, partly as a means of checking discontent, the state, in the later ages of the republic and the beginning of the empire, undertook the maintenance of its poorer citizens, either by gratuitous distributions of corn, or by the sale of food at low fixed prices. Cicero calculates the charge incurred by the revenue in consequence of this expedient at one-fifth of the public expenditure. Augustus increased the charges of maintaining these state paupers till the cost amounted to more than half of what had been the revenue of republican Rome.

The collection of taxes in Rome, both under the republic and the early empire, was intrusted to contractors, who purchased by auction the right of levying tax. The character of the Roman contractor is aptly illustrated by Livy, who narrates the frauds practiced by those persons on the Roman treasury during the deepest distresses of the second Punic war, and the violence with which other contractors defended the interests of the order in general, and the convicts in particular. But after the Macedonian war, the Roman citizen was relieved from direct taxes, the weight of which fell on the provincials. Associations of wealthy men were formed, who could give security to the government, and who, being protected by the government, could practice what extortion they pleased on the provincials. The law, indeed, provided that such persons should be liable to prosecution for corrupt and illegal practices,



but the law was far too weak to check the malpractices of the officials. It appears that the province was divided into districts, or dioceses, as they are called, a manager being appointed for each district, who was in regular correspondence with the chief of the office at Rome. The law recognized the guild of the publicans, who were indeed, by their agency, the center of the Roman system of finance, and in many emergencies the parties with whom the state negotiated for an advance on the security of its revenues. But, on the other hand, it was said with too much truth that where the tax-gatherer appeared public law and private liberty vanished.

Taxes paid in kind were the tenth of corn and the fifth of fruit. Such taxes were imposed in Sicily, in Africa, in Sardinia, and in Egypt. Spain was treated more generously, partly to compensate for the reputed unproductiveness of its soil, partly in all likelihood from fear of the high-spirited character of its inhabitants. In some cases, the contributor of the tithe had to carry his quota to the nearest port for shipment to Rome. The rest of the empire paid money taxes, partly from an assessment on the value of property, partly by what appears to be a poll tax, but was really an artificial estimate, under which several needy persons might be made to represent a unit, and on the other hand, one wealthy person might be treated as many units. The assessment lasted for a definite period, which, in the age of Constantine at least, got the name of the Indiction. In the sense of a tax, this term is as old as Pliny, if indeed it cannot be carried back to the early empire.

The finance of the Roman Empire imposed a tax on the profits of trade, which seems to have been collected with great severity, and to have exposed those who were liable to it to strict scrutiny, and to degrading punishment in case of default. Capitation taxes were levied on cattle, on imports and exports, on slaves kept for the purpose of luxury, on auctions (1 per cent), on sales in the public markets, analogous to the octroi in the French towns, on salt works, on emancipated slaves, and on successions in cases where the inheritance went by devise to strangers.

The distinction of Roman and provincial was merged in a common servitude under the edict of Caracalla, which conferred the Roman franchise upon all the subjects of the empire. The task of collecting and transmitting the taxes from the provinces to Rome, and subsequently to Constantinople, was imposed on the decurions, the senate of the colonies. These persons exercised what little authority was left to the local magistracy by the centralization and despotism of the empire, and were exempted from some of the more degrading punishments which were imposed on the mass of the people. But they bought their rank and privileges at a dear rate. They were liable, in case they failed to collect it, to the whole impost which was assessed on the locality whose affairs they administered. To escape from the dignity and responsibility of the decurion's office, without sinking into the condition of an unprotected citizen, was the object of numerous petitions to the emperor. The privilege was occasionally, sometimes lavishly, awarded, as a matter of special favor. But the necessities of the public revenue demanded that enough decurions should be left for the purpose of meeting the burden of taxation. Hence, under the financial system of the later empire, the weight of fiscal charges fell with increasing severity on the middle classes, so that, at last, when the military system of Rome collapsed, nothing remained to withstand the assaults of the barbarian invaders. One is struck at finding how small are the armies which subverted the Roman empire, and how easily they occupied Gaul, Spain, and northern Italy.

The fiscal and military system of the Roman empire caused the downfall of ancient civilization. The Roman army and the Roman exchequer were developments from a centralized despotism. The army exhausted the free growth of Italy, devoured the population of those most warlike races who were successively allowed to recruit the Roman legions; and when the subject races, from which new blood could be introduced into the forces, were thoroughly drained, the government was forced to enlist soldiers from those foreign hordes who were already threatening, and were soon about to overthrow the empire. Civil society was simultaneously crushed by a prodigious weight of taxation, arbitrarily imposed, and rigorously exacted. Before the final collapse occurred, wide regions, once occupied by opulent and populous cities, were found to be destitute of inhabitants, and released from taxation on the plea that there was no population left from which to collect a revenue. Large tracts of Asia, southern Europe, and northern Africa, have never recovered from the desolating effects which were induced on them by the fiscal and military policy of imperial Rome. A great break occurred in the history of human progress. Social development was thrown back for centuries, and in some particulars has not even yet recovered the ground on which it stood in the first century before our present era. Not a few fragments, too, survive from that imperial system which was the downfall of ancient civilization, and which will remain an impediment to modern civilization until they are completely taken out of the societies in which they have been embedded.

The history and progress of modern finance may be best studied in English fiscal history. Some countries, as Holland, adopted expedients in finance long before other states understood or accepted them; others, as France, have been informed by many acute authors of the means by which a sounder, fairer, and more productive fiscal system might be adopted in place of one which was ruinous, oppressive, and unproductive. But in England only theory and practice have gone on together—not indeed simultaneously, for the English legislature has accepted scientific principles with hesitation and slowness, but progressively, the result being a compromise, which is open indeed to serious criticism from the point of view of the economist, but is, under existing circumstances, of easy manipulation to the financier. Into the former of these we do not propose to enter; it will be treated under TAXATION; but the latter can be presented from an historical point of view.

English finance is historically connected with the foundation and growth of the English exchequer. It is further divisible into two periods—one in which almost the whole income of the sovereign, acting for the state, was derived from direct taxation; another in which a continually increasing revenue has been obtained from the indirect taxation of consumable articles. The dividing line in these two systems is the civil war of the seventeenth century; and it may be affirmed confidently that nothing but the emergencies of a great convulsion like that of the parliamentary war could have reconciled the English people to so total a change in the system of taxation as the adoption of the excise was. For more than a century after the compromise was effected, of which the perpetual, or, as it was called at first, the hereditary excise, was the outcome, the impost was detested. A generation has hardly passed away since offenses against the excise have ceased to command public sympathy, and, despite the severity with which the law treated frauds on the revenue, have been looked on as venial acts, detection in which was rather thought unlucky than scandalous. England no doubt owes the change in public sentiment, in accord-



ance with which frauds on the excise are considered criminal, to the happy change in the fiscal policy of the country, under which taxes are imposed for the purposes of revenue only, and are no longer seen to be protective or partial.

*United States.*—The history of the fiscal system of the United States is as unique as its political history. During the colonial period, each colony had its own financial policy. In their intercourse with the Indians they used such articles as were most acceptable to the aborigines, but of the least intrinsic value. The colony of Virginia, for instance, finding that glass beads were a better article of traffic with the natives than either gold or silver, in 1626 established a bead-factory, "as a mint for the coinage of a current medium of commerce with the Indians." In New England a system of barter prevailed by which peltry was exchanged with the Indians for powder, lead, arms, etc. Coined money came from Europe and from the West Indies in payment for peltry, fish, lumber, and, afterward, beef, pork, cattle and horses.

Taxes were paid in kind, both in the colonies of New England and in the South, in wheat, rye, oats, wool and other farm products by the former, and in tobacco, rice, beeswax and tallow by the latter. South Carolina collected its revenues from imports, and Maryland raised all the money needed for public purposes by a tax upon personal property. The colony of Massachusetts issued the first paper money in this country. In 1690, the General Court, "desirous to prove themselves *honest and just*, and considering the scarcity of money and the want of an adequate measure of commerce," authorized a committee to issue, in the name of the colony, 7,000 pounds in bills of credit, from two shillings to five pounds each. The following is a copy of a twenty shilling bill:

"This indented Bill of Twenty Shillings, due from the Massachusetts colony to the possessor, shall be in value equal to money, and shall be accordingly accepted by the Treasurer, and Receivers subordinate to him, in all public payts. and for any stock at any time in the Treasury, Boston, in New England. February the third, 1690 By order of the General Court. Elisha Hutchinson, John Walley, Tim. Thornton, Committee."

These bills were not accepted at par, however, by the tradesmen; and the soldiers of the "French war," for whose benefit they had been issued, lost almost half of their pay, when compelled to dispose of them. Two years later, when the bulk of these bills had passed into the hands of money-lenders, they not only were made a legal tender, but a premium of 5 per cent. was attached when presented in payment of taxes. The cry of "scarcity of money" was soon raised, and, although an order was passed limiting the issue of these bills to 40,000 pounds, 110,000 pounds had been issued in the course of twelve years. In 1712, South Carolina not only followed the example set by Massachusetts, but went a step further and established a colonial bank. Pennsylvania also went into the banking business, and so did Georgia and other States. These multifarious methods, adopted by the different colonies to establish a financial system of their own, culminated in endless confusion, and rendered all commercial transactions between the colonies difficult and insecure.

This was the financial condition of the country when the Continental Congress resolved to engage in a deadly conflict with the wealthiest power on earth. It has been estimated that, at the time when this desperate step was taken, that \$6,000,000 was all the coined money in the country, and that was in the hands of the people.

To borrow money was out of question, since the odds

of a successful issue were apparently all with Great Britain. To raise money by taxation was inexpedient, and might cause a reaction in favor of "peaceful adjustment," that is, submission.

The only way out of the difficulty was the issue of paper money. One member expressed the prevailing sentiment in Congress, when he said: "Do you think, gentlemen, that I will consent to load my constituents with taxes, when we can send to our printer, and get a wagon-load of money, one quire of which will pay for the whole." Consequently \$2,000,000 were issued; again, \$1,000,000 more; soon after, \$3,000,000 additional, and so on until \$200,000,000 had been set in circulation.

Depreciation, however, kept pace with inflation. Counterfeiting on a grand scale aggravated the trouble, and when Great Britain unblushingly entered the field as a wholesale counterfeiter of American paper money, the whole system collapsed. A new issue was decreed, based upon the credit of the States, at a discount of \$40 of the old issue for one of the new, but this remedy also proved inadequate, and was soon abandoned. The States were now asked to furnish military supplies, and, as this method also failed, seizures were resorted to; the party from whom property was seized receiving certificates. Funds were now received from France, secretly at first, openly when the Republic was recognized by the royal government. France guaranteed several loans to the United States, which were negotiated by Franklin. The finances of the government were managed by a Board of Treasury, composed of fifteen members of Congress. This board created two chambers of account, but its management proving unsatisfactory, Congress concluded to intrust the whole administration of the finances to Robert Morris, who, within three years, succeeded in bringing order out of confusion. His personal credit was excellent, and he freely used it to secure loans for the government abroad; he was instrumental in getting the system of seizures abolished by Congress; he established a bank, which proved a great benefit to the government, and he was very successful in collecting the taxes due from the States. At the conclusion of the war Morris sent an elaborate communication to Congress on the subject of coinage, showing what unit ought to be adopted. Morris resigned in 1784, and, during the five years which followed, inefficiency and disorder again reigned in the United States treasury.

With the adoption of the Constitution in 1789, the foremost questions calling the attention of Congress were the funding and payment of the war debt. Hamilton, the secretary of the treasury, contended that the holders of government certificates were entitled to their full, fair value, the fact that they had passed out of the hands of the original holders notwithstanding. Jefferson and Madison differed from him, but Hamilton's plan prevailed. The next matter to be settled was the expenditures incurred directly by the States, which were claimed to be \$25,000,000. The Northern members favored the assumption of this amount by the Federal Government; those from the South were opposed to it. In this emergency Hamilton induced a number of Southern members to vote for the measure by persuading Northern members to consent to the location of the capital on the Potomac, instead of allowing it to remain at Philadelphia.

Another branch of expenditures consisted of sums advanced to the States, and *vice versa*. Commissioners having been appointed to ascertain what was due on the one side and the other, "according to the principle of general equity," it was found that New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey, South Carolina and Georgia were the creditor States to an aggregate amount of \$3,517,584, and that New



York, Pennsylvania, Delaware, Maryland, Virginia and North Carolina were the debtor States to a similar amount. These three accounts constituted the domestic debt. They were funded at 3 and 6 per cent. interest.

The foreign debt was due to France, Holland and Spain, and, as the amounts were well known, and no objection being raised concerning its liquidation, the matter was only one of time.

After Jefferson had assumed the presidency, an act was passed for the reduction of the public debt; \$7,500,000 were to be set aside annually for this purpose. In 1803 the purchase of Louisiana increased the amount to be set aside for that purpose about \$700,000.

At the beginning of the war of 1812 the national debt had been reduced to \$45,154,189, but the urgencies of this war required the making of fresh loans to the amount of \$81,000,000. In 1834 the public debt was extinguished, and a few years later there was a surplus of \$40,000,000 in the treasury, which sum was distributed among the States. The war with Mexico again plunged the country into extraordinary expenditures, but, by judicious management, the new liabilities had almost all been liquidated in 1857. The financial panic of that year, also, embarrassed the government; the revenues being insufficient to defray the expenditures, treasury notes had to be emitted. In 1860, just before the outbreak of the civil war, the public debt amounted to \$60,000,000. In February, 1861, the government negotiated the first war loan, amounting to \$18,415,000, bearing 6 per cent. interest, and running twenty years. This loan, however, was negotiated at a discount of \$2,019,776.10. Another loan was negotiated in the summer of the same year for \$250,000,000, drawing 7 $\frac{3}{10}$  per cent. interest. The secretary of the treasury having stipulated that payment for the bonds be made in gold, and one hundred million in coin having in consequence been drawn from the banks, these were compelled to suspend specie payment, and in December, 1861, the "independent treasury" suspended also. It has been maintained that the suspension of specie payment, which has cost the taxpayers of the country untold millions, might have been avoided had the banks been permitted to pay other money than specie for the bonds. When it is considered, however, that all *other* money at that time in circulation consisted in depreciated (wild-cat) currency, the wisdom of the law, requiring gold coin to be paid for the bonds, can hardly be questioned.

There were a number of other loans authorized during the war besides the issue of legal tender notes, to the amount of \$450,000. These notes, and all other forms of indebtedness, issued from February, 1861, amounted on June 30, 1865, to \$3,888,686,575.

On January 14, 1875, a law was approved providing for the resumption of specie payment on January 1, 1879. The speculation in gold ceased from that day, and for many months before the time for specie payment had arrived the premium on gold had disappeared.

The demonetization of silver by an act of Congress in 1875, and its remonetization, form an interesting chapter in the financial history of the United States.

*United States Banking.*—*The Cyclopædia of Political Science, Political Economy and Political History of the United States*, contains the following historical data on this interesting subject:

"Under the confederation, Robert Morris, superintendent of finance, had drawn up the plan of the first national bank, which was chartered by Congress December 31, 1781, for ten years, under the name of 'The Bank of North America,' with a capital of \$400,000, afterward increased to \$2,000,000. The general doubt of the power of Congress to create a corporation, cast a

cloud upon the bank's title to existence, and it was chartered by the State of Pennsylvania in 1783. In 1785 a change of parties in the State Legislature brought about a repeal of the charter, and, in 1787, after another party change, the charter was renewed. In January, 1791, a bill to incorporate 'The Bank of the United States' passed the Senate without division, and the House February 8th, by a vote of 39 to 20. Its capital was to be \$10,000,000, of which \$2,000,000 was to be subscribed by the United States; its charter was to continue for twenty years; its bills were made receivable in all payments to the United States; and it had the power to establish branch banks, the headquarters remaining at Philadelphia. Immediately upon the passage of the bill, a strong pressure was brought to bear upon President Washington to induce him to veto it, and he therefore called for the written opinions of his cabinet upon the constitutionality of the proposed bank. The opinions submitted by Jefferson and Hamilton are most interesting, as they map out with great exactness the opposite views of the Federal Government's powers which were to control party conflict for the succeeding three-quarters of a century. Jefferson's opinion, which was first given, begins with the following text:

"I consider the foundation of the constitution as laid on this ground, that all powers not delegated to the United States by the constitution, nor prohibited by it to the States, are reserved to the States or to the people. To take a single step beyond the boundaries thus specially drawn around the powers of Congress, is to take possession of a boundless field of power, no longer susceptible of any definition.' After showing that there was no power to establish a national bank under the special powers to lay taxes, to pay the debt of the United States, to borrow money, and to regulate commerce, he proceeds to consider 'the general phrases, which were the two following: 1st, "To lay taxes to provide for the general welfare of the United States;" that is to say, "to lay taxes *for the purpose* of providing for the general welfare." For the laying of taxes is the *power*, and the general welfare the *purpose* for which the power is to be exercised. Congress are not to lay taxes *ad libitum*, *for any purpose they please*; but only *to pay the debts* or provide for the welfare of the Union. In like manner, they are not *to do anything they please*, for the general welfare, but only to lay taxes for that purpose. To consider the latter phrase, not as describing the purpose of the first, but as giving a distinct and independent power to do any act they please which might be for the good of the Union, would render all the preceeding and subsequent enumerations of power completely useless. It would reduce the whole instrument to a single phrase; that of instituting a congress with power to do whatever would be for the good of the United States; and as they would be the sole judges of the good or evil, it would be also a power to do whatever evil they pleased. Certainly, no such universal power was meant to be given them. It was intended to lace them up straightly within the enumerated powers, and those without which, as means, these powers could not be carried into effect.

"The second general phrase is 'to make all laws *necessary* and proper for carrying into execution the enumerated powers.' But they can all be carried into execution without a bank. A bank, therefore, is not necessary, and, consequently, not authorized by this phrase. It has been much urged that a bank will give great facility or convenience in the collection of taxes. Suppose this were true, yet the constitution allows only the means which are *necessary*, not those which are merely *convenient* for effecting the enumerated powers. If such a latitude of construction be allowed to this phrase as to



give any non-enumerated power, it will go to every one; for there is no one which ingenuity may not torture into a *convenience in some way or other, to some one* of so long a list of enumerated powers. It would swallow up all the litigated powers, and reduce the whole to one phrase as before observed.' "

Hamilton's opinion, though very much longer, may be given in his own summary: "1st, That the power of the government as to the objects intrusted to its management, is, in its nature, sovereign; 2d, That the right of erecting corporations is one inherent in, and inseparable from, the idea of sovereign power; 3d, That the position that the government of the United States can exercise no power but such as is delegated to it by its constitution does not militate against this principle; 4th, That the word *necessary*, in the general clause, can have no restrictive operation, derogating from the force of this principle; indeed, that the degree in which a measure is or is not necessary, cannot be a test of constitutional right, but of expediency only; 5th, That the power to erect corporations is not to be considered as an independent and substantive power, but as an incidental and auxiliary one; and was, therefore, more properly left to implication than expressly granted; 6th, That the principle in question does not extend the power of the government beyond the prescribed limits, because it only affirms a power to incorporate for purposes within the sphere of the specified powers. And, lastly, that the right to exercise such a power, in certain cases, is unequivocally granted in the most positive and comprehensive terms. To all which it only remains to be added that such a power has actually been exercised in two very eminent instances, namely, in the erection of two governments; one northwest of the river Ohio, and one southwest; the last independent of any antecedent compact."

Hamilton's opinion prevailed with the president, and the bill was signed and became a law. March 23, 1804, an act was passed, without division, to allow the bank to establish branches in the territories, and having been signed by Jefferson, now president, became law. The charter was to expire in 1811. In 1809 the bank applied for a recharter. In 1810 a bill for a recharter was introduced, met with opposition on the grounds laid down by Jefferson, and went over to the next session. It was defeated January 24, 1811. The bank then, after an unsuccessful effort to obtain a charter from the State of Pennsylvania wound up its affairs and went out of existence.

In January, 1814, an unsuccessful attempt was made in Congress for the establishment of a new national bank, and a second one in October. Several other similar efforts failed until April 10, 1816, when the act to establish "The Bank of the United States" became a law. The charter was to run twenty years, the capital was to be \$35,000,000, one-fifth in cash, the rest in United States six per cent. stocks; the government was to have the appointment of five of the twenty-five directors; and the bank was to have the custody of the public funds. The stock was at once subscribed; the principal office was opened at Philadelphia; and branches were soon established at Boston, New York, Baltimore, Portsmouth, Providence, Washington, Richmond, Charleston, Savannah, New Orleans, Cincinnati, and other cities. Within three years the mismanagement, speculations and frauds of the president and directors of the bank brought the institution to the verge of bankruptcy, and helped to derange the whole business of the country. The efforts of a new president were successful in saving the bank, but only by a curtailment and recall of loans to other banks, which aided in bringing on the general stringency of 1818-

1821, and aroused strong feelings against the bank. State Legislatures began to arraign it as unconstitutionally chartered. The Legislatures of Maryland and Ohio, in 1818, levied taxes upon the branch banks of their States, with the intention of forcing them to close. Returning prosperity changed the current of feeling, however, and Ohio withdrew from her position. No opposition to the bank was perceptible for almost ten years. But on December 8, 1829, President Jackson entered the field against the institution by making the following reference to the bank in his annual message to Congress of that date:

"The charter of the Bank of the United States expires in 1836, and its stockholders will probably apply for a renewal of their privileges. In order to avoid the evils resulting from precipitancy in a measure involving such important principles and such deep pecuniary interests, I feel that I cannot, in justice to the parties interested, too soon present it to the deliberate consideration of the Legislature and the people. Both the constitutionality and the expediency of the law creating the bank are well questioned by a large portion of our fellow-citizens, and it must be admitted by all that it has failed in the great end of establishing a uniform and sound currency." The message also suggested the substitution of a bank which should be a part of, and under the direct control of, the treasury. This part of the message having been referred to the Committee of Ways and Means of the House, which reported against the president, a resolution against the constitutionality of the bank was laid upon the table by a vote of 89 to 66.

On December 7, 1830, the president renewed the above suggestions in his message, and, Congress remaining inactive, the president, in his message of December 4, 1831, hinted broadly that, having several times called the attention of Congress to his views about the bank, he now left the matter to the people. The reference was evidently to the presidential election of 1832. Indeed, this question became the issue of the campaign.

The National Republican Convention, December 12, 1831, approved the bank as a great and beneficent institution maintaining a sound, ample and healthy state of currency, summoned the people to defend it in its peril by rejecting Jackson at the ensuing election, and nominated as its own candidates Henry Clay and John Sergeant, both pronounced bank men. The Legislature of Pennsylvania, a Jackson State, had unanimously resolved in favor of the bank, and the Clay managers seem to have decided to force the fighting in order, if possible, to deprive Jackson of Pennsylvania's large vote by compelling him to attack Philadelphia's chief institution. Clay's own private correspondence shows his belief that, all the circumstances considered, the bank would "act very unwisely if it did not apply" for a new charter at this session. The application was accordingly made January 9, 1832, by Senator Dallas of Pennsylvania, on behalf of the bank. June 11th, the bill came to a vote in the Senate, and it passed with 28 to 20 votes, and in the House July 3d, with 109 against 76. July 10th it was vetoed in a message of great ability, which was mainly devoted to proving the bank, as then constituted, to be an unnecessary, useless, expensive un-American monopoly, always hostile to the interests of the people and possibly dangerous to the government as well. An attempt to pass the bill over the veto failed. The presidential election resulted not only in Jackson's triumphant reelection, but also in the choice of a House of Representatives to meet in 1833, which was pledged to support the president against all his opponents, even against the bank.

The president now had the move and he made it. A premonition of his purpose was given in his message



of December 4, 1832, in which he announced a belief, that the bank was insolvent, and advised an investigation into its affairs, and the sale of the government stock in it. Before the meeting of the new Congress, the president had removed the deposits of public moneys from the bank, and his action was sustained by the new House. For want of any other custodian of the public funds they had been deposited in the most reliable State banks. The charge having been made that the bank endeavored to buy its way through Congress, a committee of the Senate was charged with an investigation. In its report in 1834, it was stated, that in 1831 the bank had *loaned* \$322,199 to fifty-nine congressmen; in 1832, \$478,069 to fifty-four congressmen; and in 1833, \$374,766 to fifty-eight congressmen. Finally, in April, 1834, the House of Representatives voted, first, that the bank ought not to be rechartered; second, that the deposits ought not to be restored, that they should be left in the State banks. The last effort to reestablish the United States bank was made under the administration of President Tyler in 1841. One of the bills to that effect was vetoed by him August 19th, the second, September 9th. This last veto, however, ended the list of attempts to grant to a private corporation the custody and emoluments of the national revenue.

*The National Bank System.*—Secretary Chase, in his report for 1862, earnestly advocated the passage of the national bank bill. Of the many reasons he advanced in favor of the proposition was the one, "that the United States bonds would be required for banking purposes, a steady market would be established, and their negotiation greatly facilitated, a uniformity of price for the bonds would be maintained at a rate above funds of equal credit, but not available to banking associations." "It is not easy," he said, "to appreciate the full benefits of such conditions to a government obliged to borrow; it will reconcile, as far as practicable the interests of existing institutions with those of the whole people, and will supply a firm anchorage to the union of the States." President Lincoln, in his annual message, warmly advocated the measure, and on February 20th, the national bank bill, which had been passed by the Senate on the 12th, was adopted by the House of Representatives by a vote of seventy-eight to sixty-four. More than a year afterward, on June 3, 1864, the bill was thoroughly discussed and reconstructed. The act, as finally adopted, provides for the establishment of a national bank bureau in the treasury department, the chief officer of which is the comptroller of the currency, and authorized the issue of \$300,000,000 of national bank notes to associations organized in compliance with law, and composed of any number of persons, not less than five. Circulation was authorized to issue, at a rate equal to 90 per cent. of the current market value, but not exceeding 90 per cent. upon the par value of the United States bonds deposited. The notes are guaranteed by the government, and if the avails of the bonds deposited as security for circulation are not sufficient for the reimbursement of the government, it is entitled to the first lien upon all the assets of the bank.

The law further provides that these notes shall be received by the government in payment of all taxes and other dues, except duties on imports, and payable for all debts or demands owing by the government, except interest on the public debt and in the redemption of national bank notes; and that each bank shall take and receive at par, for any debt or liability to it, any and all notes or bills issued by any lawfully organized national bank association.

But few of the old banks availed themselves of this

national banking law, until after a supplemental act, laying a tax of 10 per cent. on the amount issued by any State bank, was passed March 3, 1865, to be enforced after July 4, 1866.

How rapidly the reorganization, under the new law, and the withdrawal of the circulation of the State banks proceeded, will appear from the following statement of State and national bank notes outstanding at different dates:

| June 30. | State Bank Notes. | Nat'l Bank Notes. |
|----------|-------------------|-------------------|
| 1863     | \$238,677,218     | (None.)           |
| 1864     | 179,157,717       | \$ 31,235,270     |
| 1865     | 142,919,638       | 146,137,866       |
| 1866     | 19,996,163        | 281,419,908       |
| 1867     | 4,484,112         | 298,625,379       |

Three years after the passage of the act of March, 1865, or two years after its enforcement, the circulation of the State banks had almost entirely disappeared.

The maximum aggregate of national bank circulation was reached in 1882, when it amounted to \$362,000,000. Since then the aggregate circulation was slowly but steadily reduced until, from last report at the end of July, 1889, it appears to have shrunk to \$208,003,237. This shrinkage in the national bank circulation has been attributed to the yearly increasing emission of silver certificates. In June, 1882, there were \$54,506,090 of these certificates in circulation; in 1885 the amount had increased to \$101,533,946; in 1888 to \$200,387,376, and June 30, 1889, it amounted to \$257,102,445.

This would show that, but for the provision of the law requiring the banks to invest a certain portion of their capital in United States bonds, the national bank circulation would, at no distant day, cease to exist, when silver, or its certificate representative, would become the permanent circulating medium of the country.

FINCH, a name applied (but almost always in composition—as Bullfinch, Chaffinch, Goldfinch, Hawfinch, etc.) to a great many small birds of the Order *Passeres*, and now pretty generally accepted as that of a group or family—the *Fringillidæ* of most ornithologists, yet it is one the extent of which must be regarded as being uncertain. Many writers have included in it the Buntings, though these seem to be quite distinct, and the grounds of their separation have been before assigned as well as the Larks, the Tanagers and the Weaver-birds. Others have separated from it the Crossbills, under the title of *Loxiidæ*, but without due cause, while again some systematists have placed among the Finches the Mouse-birds—an allocation which a very slight study of osteological characters would have proved to be unsound; and a group which has no English name, including probably the genera *Panurus* (the so-called Bearded Titmouse), *Paradoxornis*, and, perhaps, a few others, has also been occasionally referred to the Finches, to all appearances erroneously. The difficulty which at this time presents itself in regard to the limits of the *Fringillidæ* arises from our ignorance of the anatomical features, especially those of the head, possessed by many exotic forms.

Taken as a whole, the Finches, concerning which no reasonable doubt can exist, are not only little birds with a hard bill, adapted in most cases for shelling and eating the various seeds that form the chief portion of their diet when adult, but they appear to be mainly forms which predominate in and are highly characteristic of the Palæarctic Region; moreover, though some are found elsewhere on the globe, the existence of but very few in the Notogæan hemisphere can as yet be regarded as certain.

FINCH, DANIEL and HENEAGE. See NOTTINGHAM, EARLS OF.

FINCK, HEINRICH, a celebrated German musical



composer, of whose life little more is known than that he was of Saxon origin, and that between 1492 and 1506 he was chapelmaster to two successive kings of Poland, at whose court in Warsaw he resided. After this he seems to have retired to Wittenberg in Saxony, where he died. The year of his death, like that of his birth, is uncertain.

FINCK, HERMANN, the nephew of the subject of last notice, has frequently been mistaken for him. The date of his birth (at Pirna in Saxony) also is uncertain, but it has recently been discovered that in 1506 he succeeded his uncle in the position of royal chapelmaster to the king of Poland. After 1553 he lived at Wittenberg, and there, in 1555, was published his collection of "wedding songs."

FINDEN, WILLIAM, English line engraver, was born in 1787. The largest plate executed by William Finden was the portrait of King George IV. seated on a sofa, after the painting by Sir Thomas Lawrence. Finden's next works on a large scale were the Highlander's Return and the Village Festival, after Wilkie's well-known works, the latter now forming part of the national collection. He died in London, unmarried, September 20, 1852.

FINDLAY, a city of northwestern Ohio, is the capital of Hancock county, and is situated in the center of the rich oil and gas region of that State. Findlay owes its rapid increase of the last few years to the utilization of natural gas for fuel and manufacturing purposes; the population of the city having increased from 5,000 in 1885 to 18,553 in 1890. Among the most notable of the manufactories are eleven glass works, employing 1,700 men; two pressed brick works, with an annual capacity of thirty million bricks; several large oil refineries, a seamless tube factory, machine shops and foundries, three rolling mills, two chain factories, a pottery, nail works, furniture and excelsior factories, tool works, woolen and linseed oil mills, carriage and harness factories, etc. Six lines of railway furnish transportation for the products of these industries. There are four lines of street railways, a Holly system of water-works, and gas and electric light plants. Among the public buildings of Findlay are the new court-house, eighteen churches, sixteen public schools, and Findlay College, a non-sectarian institution. There are four national banks, and seven weekly and four daily newspapers are issued. In the neighborhood are found exhaustless deposits of clay suitable for brick, and excellent building stone.

FINE, in law, is a pecuniary penalty inflicted for the less serious offenses. Fines are necessarily discretionary as to amount; but a maximum is generally fixed when the penalty is imposed by statute. And it is an old constitutional maxim that fines must not be unreasonable.

The term is also applied in English law to payments made to the lord of a manor on the alienation of land held according to the custom of the manor, to payments made on the renewal of leases granted by ecclesiastical and other corporations, and to other similar payments.

Fine also denotes a fictitious suit at law, which played the part of a conveyance of landed property. "A fine," says Blackstone, "may be described to be an amicable composition or agreement of a suit, either actual or fictitious, by leave of the king or his justices, whereby the lands in question become or are acknowledged to be the right of one of the parties. In its original it was founded on an actual suit commenced at law for the recovery of the possession of land or other hereditaments; and the possession thus gained by such composition was found to be so sure and effectual that ficti-

tious actions were and continue to be every day commenced for the sake of obtaining the same security."

FINE ART is the abstract or collective name given to the results of a whole group of human activities; the activities themselves which constitute the group being severally called the FINE ARTS. In antiquity the fine arts were not explicitly named, nor even distinctly recognized, as a separate class. In other modern languages besides English they are called by the equivalent name of the beautiful arts (*belle arti*, *beaux arts*, *schöne Künste*). The fine or beautiful arts, then, are those among the arts of man which minister, not to his material necessities or convenience, but to his love of beauty (using the word beauty in its widest sense); or if any art fulfills both these purposes at once, still as fulfilling the latter only is it called a fine art. Thus architecture, in so far as it provides shelter and accommodation, is one of the useful or mechanical arts, and one of the fine arts only in so far as its structures give pleasure by the aspect of strength, fitness, harmony and proportion of the masses, by disposition and contrast of light and shade, by color and enrichment, by variety and relation of lines, surfaces, and intervals.

There is no difference of opinion concerning the nature of fine art and the fine arts as thus generally described, and as contra-distinguished from art and the arts mechanical. It is acknowledged that the one set of arts exists to satisfy practical needs, and the other set exists to give delight and satisfy the sense of beauty, while as to an intermediate set of arts which exist for both purposes, it is possible to distinguish in each case the part which is beautiful or pleasurable from the part which is mechanical or merely useful. But as soon as we inquire further, and seek for more precise definitions, we find ourselves confronted with a mass of speculation and discussion as formidable as has been accumulated in any department of human thought. Granting that the fine arts are those of which the end is beauty, or beauty and use conjointly, the question next arises, what is beauty? and next, how does the beauty of art differ from the beauty of nature? and then, what place do the arts of beauty hold in the general scheme of things? — what are the relations of these activities and their results to the idea of the universe, to the faculties of man, and to each other? To such inquiries as these, enormous in extent and enormous in complexity, a separate place has been given in modern philosophy under the name of *Æsthetics*. "It is the province of *æsthetics*," says Professor Ruskin, "to tell you (if you did not know it before) that the taste and color of a peach are pleasant, and to ascertain (if it be ascertainable, and you have any curiosity to know) why they are so." But in a less sarcastic and more extended definition, it would be said that the name *Æsthetics* is intended to designate a scientific doctrine or account of beauty in nature and art, and of the faculties for enjoying and for originating beauty which exist in man. Instead, however, of an accepted or uniform science, we find on these subjects a multitude of speculations as conflicting as they are voluminous, but yet conflicting more in appearance than in reality, because the source of their contradictions lies less in difference of judgment concerning the facts themselves, than in difference of doctrine concerning the abstract order of the universe in which those facts find a place, and in consequent diversity of method in arranging and of formula in interpreting the facts.

According to the popular distinction between art and nature, the idea of art only includes phenomena, of which man is the cause — and that, when he acts not spontaneously, but with calculation; not from impulse, but from forethought; while the idea of nature includes all phenomena, both in man and the world outside him,



which take place without forethought or studied initiative of his own. This distinction we saw reason to recognize as practically valid. Art, we said accordingly, means every regulated operation or dexterity whereby we pursue ends which we know beforehand; and it means nothing but such operations and dexterities. That which any one does without thinking about it, and without considering what he is doing it for, is not art at all. Hence we shall not allow the title of fine art to natural eloquence, to charm or dignity of manner, to delicacy and tact in social intercourse, and other graces of life and conduct for which such a title is sometimes claimed, though they really proceed from an unconscious gift or unreflecting habit in those who exhibit them. All these are manifestations of the beautiful, and in witnessing them we experience a pleasure analogous, no doubt, to the pleasures of fine art. Nevertheless, so far as such manifestations are spontaneous, they are not arts, but, as we have called them, graces; they are due, as Greek theology would have expressed it, not to the teaching of Athênê, but to the gift of the Charities. When the exigencies of a deductive and ontological system lead a writer like Dr. Robert Zimmermann, of Vienna, to coördinate these spontaneous acts or traits of beautiful and expressive behavior with the deliberate artistic activities of the race, we feel that he is sacrificing to system a distinction which is essential. That distinction common parlance very justly observes, with its opposition of "art" to "nature," and its phrase of "second nature" for those habits which have become so ingrained as to seem spontaneous, whether originally the result of discipline or not. One of the essential qualities of art is premeditation; and when Shelley talks of the skylark's profuse strains of *unpremeditated art*, he in effect lays emphasis on the fact that it is only by a metaphor that he uses the word art in this case at all; he calls attention to that which (if the songs of birds are as instinctive as we suppose) precisely makes the difference between the skylark's outpourings and his own. For example, when we see a person in all whose ordinary movements there is freedom and beauty, we put down the charm of these to inherited and inbred physical aptitudes of which the person has never thought, and call it nature; but when we go on to notice that the same person is beautifully and appropriately dressed, since we know that it is impossible to dress without thinking of it, we put down the charm of this to judicious forethought and calculation, and call it art. Again, it is an established and a just practical maxim of the dramatic art, that the actor who in the moment of performance really and involuntarily surrenders himself to the emotions of his part and situation, though he may rouse the sympathies of the audience by a natural exhibition of feeling, yet is not acting like an artist, and does not produce as much effect, nor an effect of the same kind, as he does when, master of himself, he goes through a series of utterances and gestures which he has deliberately conceived and rehearsed beforehand. The task of art is not, in either of the above instances, to create a product outside of or separate from the artist. The material upon which the artist has in these cases to work consists of his or her own natural aptitudes; aptitudes, in the one case, of personal charm, which have to be made the most of by appropriate adornment; aptitudes, in the other case, for mimicry and emotional expression, which have to be made the most of by study and practice. In such instances, it may often be hard to separate the share of nature from the share of art in the result—to determine where grace ends and calculation begins, or where ends the sympathetic power of natural expression, and where begins the properly artistic power of studied and premeditated expression. Perhaps no writer has

observed the differences or laid down the boundary lines between these adjacent kingdoms of artlessness and art with more acuteness than Schleiermacher.

When we say of the fine arts as a group that they are activities which minister to the love of beauty in man, it is as if we said, the tailor's art is an activity which ministers to his need of clothes; and the inference is, in the one case as in the other, that a separate class of men is to be found in every community devoted to this particular employment. And such, practically, we all know to be the case; the gifts and calling of the artist constitute a separate profession, a profession of the producers, so to speak, of fine art, while the rest of the community are enjoyers or recipients of the fine art produced. In the most primitive societies, undoubtedly, this was not so, and we can go back to an original or rudimentary stage of every fine art at which the separation between a class of producers or performers, and a class of recipients, does not exist. Such an original or rudimentary stage of the dramatic art, for instance, we are accustomed to witness in children, who will occupy themselves at all moments with mimicry and make-believe for their own satisfaction, and without the least regard to the presence or absence of witnesses. The original or rudimentary type of the profession of imitative sculptors or painters is the cave-dweller of the palæolithic age, who, when he rested from his day's hunting, first took up the bone handle of his weapon, and with a flint either carved it into the shape, or on its surface scratched the outlines, of the animals of the chase. The original or rudimentary type of the architect, considered not as a mere builder but as an artist, is the savage who, when his tribe had taken to live in tents or huts instead of caves, first arranged the skins and timbers of his tent or hut in one way because it pleased his eye, rather than in some other way which was as good for shelter. The original type of the artificer or maker of household implements, considered in the same light, was the other savage who first took it into his head to fashion his club or spear in one way rather than in another way as good for killing, and to ornament it with tufts or markings. In none of these cases had the primitive artist any reason for pleasing anybody but himself. Again, the original or rudimentary type of lyric song and dancing arose when the first reveller clapped hands and stamped or shouted in time, in honor of his god, in commemoration of a victory, or in mere obedience to the blind stirring of a rhythmic impulse within him; and to such a display the presence or absence of witnesses does not signify at all. The original type of the instrumental musician is the shepherd, who first notched a reed and drew sounds from it while his sheep were cropping. The father of all artists in dress and personal adornment was the first wild man who tattooed himself or bedecked himself with shells and plumes. But in both of these last instances, it may be said, the primitive artist surely had the motive of pleasing not himself only, but his mate, or the female whom he desired to be his mate? However that may be, it is clear that what anyone can enjoy by himself, whether in the way of musical sounds or personal adornments, or in the way of mimicry, of rhythmic movements, of imitative or ornamental carving and drawing, of the disposition and adornment of dwelling places and utensils—the same things, it is clear, others *can* also enjoy with him. For these and similar things to give pleasure, it is not essential that others should be by; but the pleasures they give are essentially of a kind in which others can, if they are by, participate.

And so, with the growth of societies, it comes about that one class of persons separate themselves, and become the ministers or producers of this kind of pleasures,



while the rest become the persons ministered to, the participators in or recipients of the pleasures. Artists are those members of a society who are so constituted as to feel more acutely than the rest certain classes of pleasures which all can feel in their degree. By this fact of their constitution they are impelled to devote their active powers to the production of such pleasures, to the making or doing of some of those things which they enjoy so intensely when they are made and done by others. At the same time the artist does not, by assuming these ministering or creative functions, surrender his enjoying or receptive functions. He continues to participate in the pleasures of which he is himself the cause, and remains a conscious member of his own public. The architect, sculptor, painter, are able, respectively, to stand off from and appreciate the results of their own labors; the singer enjoys the sound of his own voice, and the musician of his own instrument; the poet, according to his temperament, furnishes the most enthusiastic or the most fastidious reader for his own stanzas. Neither, on the other hand, does the person who is a habitual recipient from others of the pleasures of fine art, forfeit the privilege of producing them according to his capabilities, and of becoming, if he has the power, an amateur or occasional artist. Nay, these opposite functions of producing and enjoying the fruits of production, of ministering and being ministered to, are much more commonly combined in this than in other departments of human exertion. Nearly every one is ready to be the minister, if he can, of his own higher pleasures, and therefore to be his own singer or poet, his own architect, sculptor or painter. Few are ready to be ministers of their own lower needs, and to be their own tailors, their own butchers (except in the case of wild game, the killing of which, being superfluous, possesses an attraction of which necessary killing is devoid), their own cobblers, cooks, servants, and the rest.

Plato held that the daily realities of things in experience are not realities indeed, but only far-off shows or reflections of the true realities, that is, of certain ideal or essential forms which can be apprehended as existing by the mind. Holding this, Plato saw in the works of fine art but the reflections of reflections, the shows of shows, and depreciated them according to their degree of remoteness from the ideal, typical, or sense-transcending existences. He sets the arts of medicine, agriculture, shoemaking, and the rest, above the fine arts, inasmuch as they produce something serious or useful. Fine art, he says, produces nothing useful, and makes only semblances, whereas what mechanical art produces are utilities, and even in the ordinary sense realities.

In another age, and thinking according to another system, Schiller, so far from holding thus cheap the kingdom of play and show, regarded his sovereignty over that kingdom as the noblest prerogative of man. Schiller wrote his famous *Letters on the Æsthetic Education of Man* in order to throw into popular currency, and at the same time to modify and follow up in a particular direction, certain systematic doctrines which had lately been launched upon the schools by Kant. The spirit of man, said Schiller, after Kant, is placed between two worlds—the physical world or world of sense, and the moral world or world of will. Both of these are worlds of constraint or necessity. In the sensible world, the spirit of man submits to constraint from without; in the moral world it imposes restraint from within. So far as man yields to the importunities of sense, in so far he is bound and passive, the mere subject of outward shocks and victim of irrational forces. So far as he asserts himself by the exercise of will, imposing upon sense and outward things the dominion of the moral law

within him, in so far he is free and active, the rational lord of nature, and not her slave. Corresponding to these two worlds, he has within him two conflicting impulses or impulsions of his nature, the one driving him toward one way of living, the other toward another. The one, or sense-impulsion, Schiller thinks of as that which enslaves the spirit of man as the victim of matter, the other, or moral impulsion, as that which enthrones it as the dictator of form. Between the two, the conflict at first seems inveterate. The kingdom of brute nature and sense, the sphere of man's subjection and passivity, wages war against the kingdom of will and moral law, the sphere of his activity and control, and every conquest of the one is an encroachment upon the other. One of the two, it seems, must win. The man, it seems, must either be slave or master; he must either obey the impulsion of matter, and let sense and outward shocks lay upon him the constraint of nature, or he must obey the impulsion of form, and must control and subjugate sense under the constraint of moral reason and the will. Is there, then, no hope of truce between the two kingdoms—no ground where the two contending impulses can be reconciled? Must a man either abandon law and give way to sense absolutely, or else absolutely set up law and put down sense? Nay, the answer comes, there is such a hope; such a neutral territory there exists. Between the passive kingdom of matter and sense, where man is compelled to blindly feel and be, and the active kingdom of law and reason, where he is compelled sternly to will and act, there is a kingdom where both sense and will may have their way, and where man may give the rein to all his powers. But this middle kingdom does not lie in the sphere of practical life and conduct. In practical life and conduct you cannot yield to both impulsions at once; let yourself go, in that sphere, to the allurements of sense, and you cast off law; maintain law, and you mortify sense.

It is in the sphere of these activities which neither subserve any necessity of nature, nor fulfill any moral duty, that the middle kingdom lies where sense and reason can be reconciled. Toward activities of this kind we are driven by a third impulsion of our nature not less essential to it than the other two, the impulsion, as Schiller calls it, of Play. Relatively to real life and conduct, play is a kind of harmless show; it is that which we are free to do or leave undone as we please, and which lies alike outside the sphere of needs and duties. In play we may do as we like, and no mischief will come of it. In this sphere man may put forth all his powers without risk of conflict, and may invent activities which will give it a complete ideal satisfaction to the contending faculties of sense and will at once, to the impulses which bid him feel and enjoy the shocks of physical and outward things, and the impulse which bids him master such things, control, and regulate them. In play you may impose upon Matter what Form you choose, and the two will not interfere with one another or clash. The kingdom of Matter and the kingdom of Form thus harmonized, thus reconciled by the activities of play and show, will, in other words, be the kingdom of the Beautiful. Follow the impulsion of play, and to the beautiful you will find your road; the activities you will find yourself putting forth will be the activities of æsthetic creation—you will have discovered or invented the fine arts. "Midway," these are Schiller's own words, "midway between the formidable kingdom of natural forces and the hallowed kingdom of moral laws, the impulse of æsthetic creation builds up a third kingdom unperceived, the gladsome kingdom of play and show, wherein it emancipates man from all compulsion alike of physical and of moral forces." Schiller, the poet and enthusiast, thus making his own application of the Kantian metaphysics, goes on



to set forth how the fine arts, or activities of play and show, are for him the typical, the ideal activities of the race, since in them alone is it possible for man to put forth his whole, that is his ideal self. "Only when he plays is man really and truly man." "Man ought only to play with the beautiful, and he ought to play with the beautiful only." "Education in taste and beauty has for its object to train up in the utmost attainable harmony the whole sum of the powers both of sense and spirit." And the rest of Schiller's argument is addressed to show how the activities of artistic creation, once invented, quickly react upon other departments of human life, how the exercise of the play impulse prepares men for an existence in which the inevitable collision of the two other impulses shall be softened or averted more and more. That harmony of the powers which clash so violently in man's primitive nature, having first been found possible in the sphere of the fine arts, reflects itself, in his judgment, upon the whole composition of man, and attunes him, as an æsthetic being, into new capabilities for the conduct of his social existence.

Divesting the view of Schiller of the Kantian metaphysic, we might put the matter thus. There are some things which we do because we must; those are our necessities. There are other things which we do because we ought; those are our duties. There are other things which we do because we like; those are our play. *Among the various kinds of things done by men only because they like, the fine arts are those of which the results afford to many permanent and disinterested delight, and of which the performance, calling for premeditated skill, is capable of regulation up to a certain point, but, that point passed, has secrets beyond the reach and a freedom beyond the restraint of rules.* We believe that this definition or description, avoiding barren controversy concerning the nature of beauty, will be found both to state the limits of the group of undisputed fine arts, and to enunciate some of its chief characteristics.

Architecture, sculpture, painting, music, and poetry are by common consent the five principal or greater fine arts.

It is possible in thought to group these five arts in as many different orders as there are among them different kinds of relation or affinity. One thinker fixes his attention upon one kind of relations as the most important, and arranges his group accordingly; another upon another; and each, when he has done so, is very prone to claim for his arrangement the virtue of being the sole essentially and fundamentally true. For example, we may ascertain one kind of relations between the arts by inquiring which is the simplest or most limited in its effects, which next simplest, which less simple still, which least simple or most complex of them all. This, the relation of progressive complexity of comprehensiveness between the fine arts, is the relation upon which an influential thinker of recent times, Auguste Comte, has fixed his attention, and it yields in his judgment the following order: Architecture lowest in complexity, because both of the kinds of effects which it produces, and the material conditions and limitations under which it works; sculpture next; painting third; then music; and poetry highest, as the most complex or comprehensive art of all, both in its own special effects and in its resources for ideally calling up the effects of all the other arts, as well as all the phenomena of nature and experiences of life. A somewhat similar grouping was adopted, though from the consideration of a wholly different set of relations, by Hegel. Hegel fixed his attention on the varying relations borne by the idea, or spiritual element, to the embodiment of the idea, or material element, in each art. Leaving aside that part

of his doctrine which concerns, not the phenomena of the arts themselves, but their place in the dialectical world-plan, or scheme of the universe—Hegel said in effect something like this. In certain ages and among certain races, as in Egypt and Assyria, and again in the Gothic age of Europe, mankind has only dim ideas for art to express, ideas insufficiently disengaged and realized, of which the expression cannot be complete or lucid, but only adumbrated and imperfect; the characteristic art of those ages is a symbolic art, with its material element predominating over and keeping down its spiritual, and such a symbolic art is architecture. In other ages, as in the Greek age, the ideas of men have come to be definite, disengaged, and clear; the characteristic art of such an age will be one in which the spiritual and material elements are in equilibrium, and neither predominates over or keeps down the other, but a perfectly distinct idea is expressed in a perfectly adequate form; this is the mode of expression called classic, and the classic art is sculpture. In other ages, again, and such are the modern ages of Europe, the idea grows in power and becomes importunate; the spiritual and material elements are no longer in equilibrium, but the spiritual element predominates; the characteristic arts of such an age will be those in which thought, passion, sentiment, aspiration, emotion, emerge in freedom, dealing with material form as masters, or declining its shackles altogether; this is the romantic mode of expression, and the romantic arts are painting, music and poetry.

The students of human culture have within the last hundred years concentrated a great deal of attentive thought upon the history of fine art, and have put forth various comprehensive generalizations intended at once to sum up, and to account for, the phases and vicissitudes of that history. The most famous formula of all is that of Hegel, to which we have already alluded. Hegel, we learned, regarded particular arts as being characteristic of and appropriate to particular forms of civilization and particular ages of history. For him, architecture was the symbolic art appropriate to ages of obscure and struggling ideas, and characteristic of the Egyptian and the Asiatic races of old and of the mediæval age in Europe. Sculpture was the classical art appropriate to ages of lucid and self-possessed ideas, and characteristic of the Greek and Roman period. Painting, music, and poetry were the romantic arts, appropriate to the ages of complicated and overmastering ideas, and characteristic of modern humanity in general. In the working out of these generalizations, Hegel has brought together a great mass of judicious and striking observations; and that they are generalizations containing on the whole a preponderance of truth may be admitted. It has been objected against them, from the philosophical point of view, that they too much mix up the definition of what the several arts theoretically are with considerations of what in various historical circumstances they have practically been. From the historical point of view, there can be taken what seems a more valid objection, that these formulas of Hegel tend too much to concentrate the attention of the student upon the one dominant art chosen as characteristic of any period, and to give him false ideas of the proportions and relations of the several arts at the same period,—of the proportions and relations which poetry, say, really bore to sculpture among the Greeks and Romans, or sculpture to architecture among the Christian nations of the Middle Age. The truth is, that the historic survey gained over any field of human activity from the height of generalizations so vast in their range and scope as these are, must needs, in the complexity of earthly affairs, be a survey too distant to give much guidance until its omissions are filled up by a great deal of nearer study;



and such nearer study is apt to compel the student in the long run to qualify the theories with which he has started until they are in danger of disappearing altogether.

Another systematic exponent of the universe, whose system is very different from that of Hegel, Mr. Herbert Spencer has brought the great scientific generalization of our time, the doctrine of Evolution to bear, not without interesting results, upon the history of the fine arts and their development. Mr. Herbert Spencer sets forth how the manual group of fine arts, architecture, sculpture, and painting, were in their first rudiments bound up together, and how each of them in the course of history has liberated itself from the rest by a gradual process of separation. These arts did not at first exist in the distinct and developed forms in which we have above described them. There were no statues in the round, and no painted panels or canvases hung upon the wall. Only the rudiments of sculpture and painting existed, and that only as ornaments applied to architecture, in the shape of tiers of tinted reliefs, representing, in a kind of picture-writing, the exploits of kings upon the walls of their temple-palaces. Gradually sculpture took greater salience and roundness, and tended to disengage itself from the wall, while painting found out how to represent solidity by means of its own, and dispensed with the raised surface upon which it was first applied. But the old mixture and union of the three arts, with an undeveloped art of painting and an undeveloped art of sculpture still engaged in or applied to the works of architecture, continued on the whole to prevail through the long cycles of Egyptian and Assyrian history. In the Egyptian palace-temple we find a monument at once political and religious, and into this one class of monument we find concentrated all the energies and faculties of all the artificers of the race. With its incised and pictured walls, its half-detached colossi, its open and its colonnaded chambers, the forms of the columns and their capitals recalling the stems and blossoms of the lotus and papyrus, with its architecture everywhere taking on the characters and covering itself with the adornments of immature sculpture and painting — this structure exhibits within its single fabric the origins of the whole subsequent group of shaping arts. From hence it is a long way to the innumerable artistic surroundings of later Greek and Roman life, the many temples with their detached and their engaged statues, the theatres, the porticos, the baths, the training schools, with free and separate statues, both of gods and men, adorning every building and public place, the frescoes upon the walls, the panel-pictures hung in temples and public and private galleries.

In the terms of the theory of evolution, the advance from the early Egyptian to the later Greek stage is an advance from the one to the manifold, from the simple to the complex, from the homogeneous to the heterogeneous, and affords a striking instance of that vast and ceaseless process of differentiation and integration which it is the law of all things to undergo. In the Christian monuments of the early Middle Age, again, the arts have gone back to the rudimentary stage, and are similarly attached to and combined with each other. The single monument, the one great birth of art, in that age, is the Gothic church. In this we find the art of applied sculpture exercised in fashions infinitely rich and various, but entirely in the service and for the adornment of the architecture; we find painting exercised in fashions more rudimentary still, principally in the forms of colored imagery in the chancel windows and illuminated miniatures in the pages of missals and service-books. And from this stage again the process of the differentiation of the arts is repeated. It is by a new evolution or

unfolding, and by one carried to much farther and more complicated stages than the last had reached, that the arts since the Middle Age have come to the point where we find them to-day; when architecture is applied to a hundred secular uses with not less magnificence, or at least not less desire of magnificence, than that with which it fulfilled its single sacred use of old; with sculpture adorning, or intended to adorn, all our streets and commemorating all our likenesses; with the subjects of painting extended from religion to all life and nature, until this one art has been divided into the dozen branches of history, landscape, still life, genre, anecdote, and the rest. Such being in brief the successive stages, and such the reiterated processes, of evolution among the shaping arts, the action of the same law can be traced in the growth of the speaking or time arts also. Originally poetry and music, the two great speaking arts were not separated from each other and from the art of bodily motion, dancing. The father of song, music and dancing, all three, was that savage of whom we have already spoken, who first clapped hands and leapt and shouted in time at some festival of his tribe. From the clapping, or rudimentary rhythmical noise, has been evolved the whole art of instrumental music, down to the entrancing complexities of the modern symphony. From the shout, or rudimentary emotional utterance, has proceeded by kindred evolution the whole art of vocal music down to the modern opera or oratorio. From the savage leap, or rudimentary expression of emotion by rhythmical movements of the body, has descended every variety of dancing, from the stately figures of the tragic chorus of the Greeks to the *kordax* of their comedy or the *cancan* of modern Paris.

That the theory of evolution serves well to group and to interpret many facts in the history of art we are not disposed to deny, though it would be easy to show that Mr. Herbert Spencer's instances and applications are not sufficient to sustain all the conclusions that he seems to draw from them. Thus, it is perfectly true that the Egyptian or Assyrian palace wall is an instance of rudimentary painting and rudimentary sculpture in subservience to architecture. But it is not less true that races who had no architecture at all, but lived in caverns of the earth, exhibit, as we have already had occasion to notice, the rudiments of the other two arts, in a different form, in the carved or incised handles of their weapons. And it is almost certain that, among the nations of Oriental antiquity themselves, the art of decorating solid walls so as to please the eye with patterns and representations of natural objects was itself borrowed from the precedent of an older art, which works in easier materials, the art of weaving or tapestry. It would be in the perished textile fabrics of the earliest dwellers in the valley of the Nile and the Euphrates that we should find, if anywhere, the origins of the systems of surface design, whether conventional or imitative, which those races afterward applied to the decoration of their solid constructions. Not in any one exclusive type of primitive artistic activity, but in a score of such types equally, varying according to race, region, and circumstances, shall we find so many germs or nuclei from which whole families of fine arts have in the course of the world's history differentiated and unfolded themselves. And once, at least, during that history, a cataclysm of all the political and social forces has not only checked the process of the evolution of the fine arts, but from an advanced stage of development has thrown them back again — we speak especially of the manual group — to the primitive stage where they are all practiced conjointly and in mutual independence. By Mr. Herbert Spencer's application of the theory of evolution, not less than by Hegel's theory of the historic



periods, attention is called to the fact that Christian Europe, during several centuries of the Middle Age, presents to our study a civilization analogous to the civilization of the old Oriental empires in this respect, that its ruling and characteristic manual art is architecture, to which sculpture and painting are, as in the Oriental empires, once more subjugated and attached. It does not of course follow that such periods of fusion or mutual dependence among the arts are periods of bad art. On the contrary, each stage of the evolution of any art has its own characteristic excellence. There is an excellence of sculpture as a decorative or subsidiary art, and that it reached in the Gothic age. There is an excellence of sculpture as an independent art, and that it reached in Greece in the fifth century B.C., and again approached in Tuscany in the fifteenth century A.D. The arts can be employed in combination, and yet be all severally excellent. When music, dancing, acting and singing were combined in the performance of the Greek chorus, the combination no doubt presented a relative perfection of each of the four elements analogous to the combined perfection, in the contemporary Doric temple, of pure architectural form, sculptured enrichment of spaces specially contrived for sculpture in the pediment and frieze, and colored decoration over all. The extreme differentiation of any art from every other art, and of the several branches of one art among themselves, does not by any means tend to the perfection of that art. The process of evolution among the fine arts may go, and, indeed, in the course of history has gone, too far. Thus an artist of our own day is usually either a painter only or a sculptor only; but yet it is acknowledged that the painter who can model a statue, or the sculptor who can paint a picture, is likely to be the more efficient master of both arts; and in the best days of Florentine art the greatest men were generally painters, sculptors, architects and goldsmiths all at once. In like manner a landscape painter who paints landscape only is apt not to paint it so well as one who paints the figure too; and in recent times the skill of engraving had almost perished from the habit of allotting one part of the work, as skies, to one hand, another part, as figures, to a second, and another part, as landscape, to a third. This kind of continually progressing subdivision of labor, which seems to be the necessary law of industrial processes, is fatal to any skill which demands, as skill in the fine arts, we have seen, demands, the free exercise and direction at every moment of a highly complex cluster both of faculties and sensibilities. Turning to the other group of arts, there are reformers who say that the process of evolution and differentiation has in like manner gone too far with music. Music, as separated from words and actions, say Dr. Wagner and his followers — independent orchestral and instrumental music — has reached its utmost development, and its farther advance can only be an advance into the inane; while the music that is still associated with words, operatic music, has broken itself up into a number of set and separate forms, as aria, scena, recitative, which correspond to no real varieties of instinctive emotional utterance, and in the aimless production of which the art is in danger of paralyzing and stultifying itself. This process, they say, must be checked; music and words must be brought back again into close connection and mutual dependence; the artificial opera forms must be abolished, and a new and homogeneous musical drama must be created, of which the author shall combine in himself the now differentiated functions of poet, composer, inventor and director of scenery and stage appliances, so that the entire creation may bear the impress of a single mind.

It is thus evident that the evolution theory furnishes us

with some instructive points of view for the history of the fine arts as for other things. Another key to what is called the philosophy of that history, although one which has been employed with results perhaps less really luminous than they are certainly showy and attractive, is that supplied by a distinguished French writer, M. Taine. M. Taine's philosophy, which might perhaps be better called a natural history, of fine art, consists in regarding the fine arts as the necessary result of the general conditions under which they are at any time produced — conditions of race, conditions of climate, conditions of religion, civilization, and manners. Acquaint yourself with these conditions as they existed in any given people at any given period, and you will be able to account for the characters assumed by the arts of that people at that period and to reason from one to the other, as a botanist can account for the flora of any given locality and can reason from its soil, exposure, and temperature, to the orders of vegetation which it will produce. This method of treating the history of the fine arts, again, is one which can be pursued with profit, in so far as it makes the student realize the connection of fine art with human culture in general, and teaches him how the arts of any age and country are not an independent or arbitrary phenomenon, but are essentially an outcome, or efflorescence, to use a phrase of Professor Ruskin's, of many deep-seated elements in the civilization which produces them. But it is a method which, rashly used, is very apt to lead to a hasty and one-sided handling both of history and of art. It is easy to fasten on certain obvious relations of fine art to general civilization when you know a few of the facts of both, and to say, the cloudy skies and mongrel industrial population of Amsterdam at such and such a date had their inevitable reflection in the art of Rembrandt; the wealth and pomp of the full-fleshed burghers and and burgesses of Antwerp had theirs in the art of Rubens. But to do this in the precise and conclusive manner of M. Taine's treatises on the philosophy of art always means to ignore a large range of conditions or causes for which no corresponding effect is on the surface apparent, and generally, also, a large number of effects for which appropriate causes cannot easily be discovered either. The truth is, that this particular efflorescence of human culture depends for its character at any given time upon combinations of causes which are by no means simple, but generally highly complex, obscure, and nicely balanced.

Either of the three modes of generalization to which we have referred might no doubt yield, however, supposing in the student the due gifts of patience and of caution, a working clue to guide him through that immense region of research, the history of the fine arts. But it is hardly possible to pursue to any purpose the history of the two great groups, the shaping group and the speaking group, together. Words are a means of expression which men have generally mastered more quickly than any other; and in Greece all three divisions of the art of poetry, the narrative, lyric, and dramatic, had been perfected, and two of them had again declined, before sculpture reached maturity, or painting had passed beyond the stage of its early severity. Again, many nations have been great in poetry at a time when their other fine arts flourished humbly if at all — as England in the days of Elizabeth. The history of poetry must thus of necessity be a separate study. And so must the history of music. Music in its independent development is an invention, — whether made, as some think, in response to the special needs of modern souls, or, as others hold, simply like other inventions in the progress of human ingenuity — but at any rate an invention of the last 200 years.

On the other hand, it is very possible to take the



whole of the shaping group of fine arts together, and to pursue connectedly the history, throughout the course of civilization, of architecture, sculpture, and painting, and of their mutual relations with one another. Being all arts of manual dexterity, and all occupied in providing for our delight objects intended for visual contemplation in space, these have a natural and practical affinity. Leaving aside the arts of the races of Egypt and the East, which, profoundly interesting as they are, have had no direct effect upon ourselves except in so far as they communicated the first hints or germs of inspiration to the ancestors and masters of Western civilization, the Greeks,—leaving those aside, the history of the manual arts of architecture, painting and sculpture, falls naturally into four great periods or divisions:—(1) the Greek and Roman period, from about 700 B.C. to the final triumph of Christianity, say 400 B.C.; (2) the Christian period, from the triumph of Christianity to about 1260 A.D. in Italy and about 1460 in northern Europe; (3) the Renaissance period, from the above dates till about 1620 A.D.; (4) the modern period, from about 1620 to our own day. We have not set down, as is usually done, a specifically Gothic age in art, for this reason. The characteristic of the whole Christian period is, that its dominant art is architecture, chiefly employed in the service of the church, and with the arts of painting and carving only applied subordinately for its enrichment. It makes no essential difference to this fundamental character that, from the fifth to the twelfth century, the forms of this art were derived in the east of Europe from the Byzantine branch, and in the west from the branch usually called Romanesque, of the round-arched architecture of the empire; and that, by the thirteenth century, a new form of architecture, in which the round arch was replaced by the pointed, and the decorations took another character, had been invented in France, and from thence spread abroad to Germany, England, Spain, and last to Italy. The essential difference only begins when the imitative arts, sculpture and painting, begin to develop and detach themselves, to exist and strive after perfection on their own account. This happens in Italy with the artificers of the thirteenth and fourteenth centuries, with Niccola Pisano and Giotto; and it happens, though the respective arts are still wholly engaged upon ecclesiastical subjects, in connection with an incipient study of and passion for antique models. From this time and onward, that movement of men's minds which gradually enthroned the images of pagan antiquity beside those of Christian worship as the ideal theme of art, continued until, in the fifteenth century, it communicated itself to the more pious races of the North, and until in Italy reached its culmination in the genius of Michelangelo and of Raphael. The same movement of the arts held on, with its energy exhausted and its inspiration flagging, until, soon after the beginning of the seventeenth century, the Dutch school of common life appeared, and announced the greatest revolution of all. This is a revolution which has its counterpart in literature, too, and which proceeds from a modern manner of regarding life totally different from that of either antiquity, the Christian Middle Age, or the Renaissance. By it the fine arts were brought down from the exclusive regions of the religious and the classical ideal, and launched upon their human, their secular, their democratic, their realistic career, of which who shall as yet foretell the issue?

FINGAL, the name of the chief hero in the English prose epics called the *Poems of Ossian*, written in the last century by James Macpherson, and based to a certain extent upon poems and prose tales to be found in manuscripts written in Irish—the literary language

common to both Ireland and Gaelic Scotland, or still preserved in memory by the Celtic-speaking people of both countries.

FINI. See MASOLINO.

FINIGUERRA, MASO (contraction for TOMMASO), a Florentine goldsmith, is distinguished as the inventor of the method of taking impressions from engraved plates. The date of his birth is not ascertained, and conjectures vary from 1400 to 1426. He was one of the best workers in niello, a form of decorative art then very much in vogue in Italy, which, however, in the next century fell into neglect. He is said to have been a pupil of the famous sculptor Lorenzo Ghiberti, and to have assisted him in the execution of the beautiful bronze gates of the baptistry of Florence; but whether the first or second pair of gates is not stated. Baldinucci makes him a pupil of Masaccio; but it appears probable that he was rather one of those art students who were powerfully influenced by the new style, noble in simplicity, of Masaccio's works, than a personal disciple of the painter. One indisputably genuine work of Finiguerra is still extant, a silver Pax on which is wrought in niello a representation of the Coronation of the Virgin. By some writers it is called an Assumption. It was executed for the church of San Giovanni Battista at Florence, and is still preserved there. It is in height a little more than four inches, and in breadth about three inches; and within this small space is a composition of more than forty figures, marvelous for accuracy of drawing and minute finish. The date of its completion is fixed by an entry in the city archives, under the year 1452. During the progress of the work the artist, according to the custom, took casts in sulphur from the plate, and also impressions upon damped paper. For these impressions he made use of a smooth roller, which he passed over the paper on the plate, and produced impressions that looked like pen drawings. This method was followed by other workers; and thus copper-plate engraving and printing soon became generally practiced in Italy. The title of Finiguerra to the discovery was long disputed, especially on the ground that while prints by early German masters were in existence bearing earlier dates than any Italian engravings, not a single print by Finiguerra could be produced in support of his claim. The question was settled by Zani's discovery in 1797, in the National Cabinet of Paris, of the identical impression taken by the artist himself from the silver Pax of San Giovanni. This print is believed to have been executed as early as 1440. Zani's account of his discovery (see Otley's *History of Engraving*, vol. i. pp. 306-312) is a singularly fascinating narrative, breathing an enthusiasm as intense and a joy as devout as those of a Columbus who first sights a long-sought world. The date of Maso's death is not known. Zani places it about 1460, others about 1475.

FINISTÈRE, or FINISTERRE, the most western department of France, forming part of the old province of Bretagne or Brittany, is bounded on the northwest and south by the ocean, and on the east by the departments of Côtes-du-Nord and Morbihan.

FINLAND (the Swampy Region, of which Finland—Fen Land—is said to be a Swedish translation), a grand-duchy forming an administrative division or government of Russia. It is bounded on the north by Norway, on the east by the governments of Archangel and Olonetz, on the south by the gulf of Finland, and on the west by the gulf of Bothnia. Its greatest length is 717 miles, greatest breadth 378 miles, the average breadth being about 185 miles; the area is 144,221 square miles.

The czar of Russia is grand-duke of Finland, the external affairs of both countries being the same. So far as internal administration is concerned, Finland is an



independent state. The constitution dates from 1772-1789, and is based besides upon the pledge of the czar Alexander I. in 1809, renewed by his successors, and upon the decree of the diet of date 1869. The czar decides as to war and peace, and as to treaties, has the right of pardon, appoints the officials of the country, who, however, must be natives, and is the last appeal in law. The government of the country and the administration of justice are carried on by the Imperial Senate for Finland, consisting of eighteen members appointed by the czar, under the presidency of the governor-general of Finland. The particular affairs on which the czar has to decree are laid before him by the state secretary for Finland. The legislative function is exercised by the czar and diet or landtag (*Seim*), without the consent of which no law can be either ordained or repealed, no taxes imposed, or soldiers levied. The diet is called together every five years, and consists of the representatives of the nobility, clergy, citizens and peasantry.

It was probably at the end of the seventh or beginning of the eighth century that the Finns took possession of what is now Finland, though it was only when Christianity was introduced, about 1157, that they were brought into contact with civilized Europe. They probably found the Lapps in possession of the country. The early Finlanders do not seem to have had any governmental organization, but to have lived in separate communities and villages independent of each other. Their mythology consists in the deification of the forces of nature, as "Ukko," the god of the air, "Tapio," god of forests, "Ahti," the god of water, etc.

These early Finlanders seem to have been both brave and troublesome to their neighbors, and their repeated attacks on the coast of Sweden drew the attention of the kings of that country. King Eric IX. (St. Eric), accompanied by the bishop of Upsala, Henry (an Englishman, it is said), and at the head of a considerable army, invaded the country in 1157, when the people were conquered and baptized. King Eric left Bishop Henry with his priests and some soldiers behind to confirm the conquest and complete the conversion. After a time he was killed, canonized, and as St. Henry became the patron saint of Finland. As Sweden had to attend to her own affairs, Finland was gradually reverting to independence and paganism, when in 1209 another bishop and missionary, Thomas (also an Englishman), arrived, and recommenced the work of St. Henry. Bishop Thomas nearly succeeded in detaching Finland from Sweden, and forming it into a province subject only to the pope. The famous Birger Jarl undertook a crusade in Finland in 1249, compelling the Tavastians, one of the subdivisions of the Finlanders proper, to accept Christianity, and building a castle at Tavastehus. It was Torkel Knutson who conquered and connected the Karelian Finlanders in 1293, and built the strong castle of Wiborg. Almost continuous wars between Russia and Sweden were the result of the conquest of Finland by the latter. In 1323 it was settled that the river Rajajoki should be the boundary between Russia and the Swedish province. After the final conquest of the country by the Swedes, they spread among the Finlanders their civilization, gave them laws, accorded them the same civil rights as belonged to themselves, and introduced agriculture and other beneficial arts. The Reformed religion was introduced into Finland by Gustavus Vasa about 1528, and King John III. raised it to the dignity of a grand-duchy. The country suffered, sometimes deplorably, in most of the wars waged by Sweden, especially with Russia and Denmark. His predecessor having created an order of nobility—counts, barons, and nobles, Gustavus Adolphus in the beginning of the seventeenth

century established the diet of Finland, composed of the four orders of the nobility, clergy, bourgeois, and peasants. Gustavus and his successor did much for Finland by founding schools and gymnasia, building churches, encouraging learning, and introducing printing. During the reign of Charles XI. (1692-1696) the country suffered terribly from famine and pestilence; in the diocese of Abo alone 60,000 persons died in less than nine months. Finland has been visited at different periods since by these scourges; so late as 1848 whole villages were starved during a dreadful famine.

Peter the Great cast an envious eye on Finland and tried to wrest it from Sweden; in 1710 he managed to obtain possession of the towns of Keksholm and Villmanstrand; and by 1716 all the country was in his power. Meantime the sufferings of the people had been great; thousands perished in the wars of Charles XII. By the peace of Nystad in 1721 the province of Wiborg, the eastern division of Finland, was finally ceded to Russia. But the country had been laid very low by war, pestilence, and famine, though it recovered itself with wonderful rapidity. In 1741 the Swedes made an effort to recover the ceded province, but through wretched management suffered disaster, and were compelled to capitulate in August, 1742, ceding by the peace of Abo, next year, the towns of Villmanstrand and Fredrikshamn. Nothing remarkable seems to have occurred till 1788, under Gustavus III., who began to reign in 1771, and who gave the Finlanders those fundamental laws by which they are still essentially governed. The country was divided into six governments, a second superior court of justice was founded at Wasa, many new towns were built, commerce flourished, and science and art were encouraged. Latin disappeared as the academic language, and Swedish was adopted. In 1788, however, war again broke out between Sweden and Russia, and was carried on for two years without much glory or gain to either party, the main aim of Gustavus being to recover the lost Finnish province. In 1808, under Gustavus IV., peace was again broken between the two countries, and the war ended by the cession in 1809 of the whole of Finland and the Aland Islands to Russia, which has ever since maintained her supremacy. The Finlanders themselves fought bravely against Russia, and it is said that bribery had not a little to do with the result. The emperor Alexander I. convoked the diet at Borgo in 1809, when he issued a manifesto undertaking to preserve the religion, laws, and liberties of the country. This pledge has been taken by his successors, and probably Finland is the freest and best governed part in the Russian empire. A senate was created and a governor-general named. The province of Wiborg was reunited to Finland in 1811, and Abo remained the capital of the country till 1821, when the civil and military authorities were removed to Helsingfors; the university in 1827. The diet, which had not met for fifty-six years, was convoked by Alexander II. at Helsingfors in 1863, and has met every five years since. Since 1860 Finland has been allowed the use of a coinage peculiar to itself. Under Alexander II. Finland has been on the whole prosperous and progressive. The use of the Finnish tongue is everywhere encouraged, though the upper classes mostly use Swedish, and the study of the Russian language was made compulsory in all the state schools in 1872.

These five groups of Finns form one linguistic family, to which Samoyede is related. The richest and most highly cultivated languages of the family are the Suomi and Magyar. The dialects are all distinctly agglutinative forms of speech, with decided tendencies toward true inflection, so much so that in many grammatical endings the



essential difference between agglutination and inflection becomes obscured. As in other Uralo-Altaic tongues, progressive vowel-harmony forms a characteristic feature of the Finnic group. Rask considered the Finnish language the most sonorous and harmonious of tongues. It is maintained by some that the Finnic languages represent the oldest forms among the Uralo-Altaic groups. There is strong evidence that the Finns, or a closely allied race, must have at one time, probably prehistoric, been spread over a considerable area of central, if not of western Europe.

Finland can boast of a varied literature more or less indigenous, the great monument of which is, however, *Kalewala*, a sort of epic poem, which, until the present century, existed only in fragments in the memories and on the lips of the peasantry. A collection of these scattered songs was published in 1822 by Dr. Zacharias Topelius, but it was not till 1835 that anything like a complete and systematically arranged collection was given to the world by Dr. Elias Lönnrot.

FINLAY, GEORGE, the historian of Greece "from its conquest by the Romans to the present time," was born of Scottish parents at Faversham, Kent, on December 21, 1799. He received his preliminary technical training in a writer's office in Glasgow, and, when little over twenty years of age, went to Göttingen to complete his studies in Roman law. But before this time he had begun to feel a deep interest in the contemporary affairs of Greece, and at the Hanoverian university he was wholly unable to withdraw his attention from the stirring drama which was then being unfolded in the southeastern corner of Europe. "I conversed much," he says, "with everybody I met who had visited Greece, read all the works of modern travelers, and associated a great deal with the only Greek who was then studying at Göttingen." In 1823 he resolved to visit the country personally, in order that he might judge for himself of the condition of the people and the prospects of the war. In November, accordingly, he arrived in Cephalonia, where he first met Lord Byron, by whom, as well as by Sir Charles Napier, the British resident, he was very kindly received. Shortly afterward he was landed at Pyrgos, and during the next fourteen months, which were spent partly at Athens and partly at Missolonghi, he greatly improved his knowledge of the language, history and antiquities of the country. While soon led to form a very unfavorable opinion of the rapacity, selfishness and incompetency of the Greek leaders, both civil and military, he by no means lost his enthusiasm for the cause of Greek independence. A severe attack of fever, however, combined with other circumstances, to make a change of scene desirable in December, 1824. The rest of that winter accordingly, and the spring of 1825, were spent in Rome, Naples and Sicily. After spending a summer at Castle Toward, Argyllshire, he went to Edinburgh, where he attended classes in the university, and passed his examination in civil law with a view to being called to the Scottish bar. His unquenched enthusiasm for Greece, however, made it impossible for him to resist the pressing invitation of his friend Hastings that he should return to that country, and thenceforward, if we except a few brief journeys (one to England in 1826, in order to secure the services of some competent engineers), the remainder of his life was wholly spent in the land of his adoption. His first publications were *The Hellenic Kingdom and the Greek Nation* (London, 1836); and *Remarks on the Topography of Oropia and Diacria, with a map* (Athens, 1838). The first installment of his great historical work appeared in 1844 (the second edition in 1857) under the title *Greece under the Romans; a Historical View of the Condition of the Greek Nation from the time of its*

*Conquest by the Romans until the Extinction of the Roman Empire in the East*. The *History of the Byzantine and Greek Empires from 716-1453* was completed in 1854. It was speedily followed by the *History of Greece under Othoman and Venetian Domination* (1856), and by the *History of the Greek Revolution* (Edinburgh, 1861). Weak in health, and conscious of failing energy, he now gave the last years of his life to the task of revising, supplementing and partly re-writing his great work. From 1864 to 1870 he was also correspondent of the *Times* newspaper, and at various periods he contributed articles to *Blackwood's Magazine*, the *Athenæum* and the *Saturday Review*. He was a member of several learned societies; and in 1854 he received from the university of Edinburgh the honorary degree of LL.D. He died at Athens on January 26, 1875.

FIORENUOLA, a small town of Italy, in the province of Piacenza, about thirteen miles from the city of that name, on the right of the Arda, which is there crossed by a noble bridge.

FIORILLO, JOHANN DOMINICUS, German painter and historian of art, was born at Hamburg, October 13, 1748. He received his first instructions in art at an academy of painting at Baireuth; and, in 1761, to continue his studies, he went first to Rome, where for four years he was the pupil of Batoni, and next to Bologna, where he studied under Bigari and Lulli. He distinguished himself sufficiently to attain, in 1769, admission to the academy of that city. Returning soon after to Germany, he obtained the appointment of historical painter to the court of Brunswick. In 1781 he removed to Göttingen, occupied himself as a drawing-master, and was named, in 1784, keeper of the collection of prints at the university library. He was appointed professor extraordinary in the philosophical faculty in 1799, and ordinary professor in 1813. During this period he had made himself known as a writer by the publication of his *Geschichte der beichnenden Künste*, in five volumes (1798-1808). This was followed, in 1815 to 1820, by the *Geschichte der zeichnenden Künste in Deutschland und den vereinigten Niederlanden*, in four volumes. These works, though not attaining to any high mark of literary excellence, are esteemed for the information collected in them, especially on the subject of art in the later Middle Ages. Fiorillo practiced his art almost till his death, but has left no memorable masterpiece. The most noticeable of his paintings is, perhaps, the *Sur-render of Briseis*. He died at Göttingen, September 10, 1821.

FIR, the name originally given by our Scandinavian forefathers to the Scotch pine, is at present not infrequently employed as a general term for the whole of the true Conifers; but, in a more exact sense, it has been transferred to the "spruce" and "silver firs," the genera *Abies* *Picea* of most modern botanists.

The firs are distinguished from the pines and larches by having their needle-like leaves placed singly on the shoots, instead of growing in clusters from a sheath or abortive branch. Their cones are composed of thin, rounded, closely-imbricated scales, furnished in some species with bracts springing from the base. The trees have usually a straight trunk, and a tendency to a conical or pyramidal growth—throwing out each year a more or less regular whorl of branches from the foot of the leading shoot, while the buds of the lateral boughs extend horizontally.

FIRDOUSÍ. Abu'l Cásim Mansúr, who took the *nom de plume* of Firdousí, was a Persian poet of great eminence, and is chiefly known to European readers by his magnificent poem the *Shahnamah*, or "Book of Kings," a complete history of Persia in nearly 60,000



verses. He was born at Shadab, a suburb of Tús, about the year 329 of the Hegira, (941 A.D.) His father, Maulana Ahmed, son of Maulana Fakhr-ed-dín el Firdousí, belonged to the class of *Dirkans* (the old native country families and landed proprietors of Persia, who had preserved their influence and status under the Arab rule), and possessed an estate in the neighborhood of Tús. Firdousí's own education eminently qualified him for the gigantic task which he subsequently undertook, for he was profoundly versed in the Arabic language and literature and had also studied deeply the Pehlavi or Old Persian, and was conversant with the ancient historical records which existed in that tongue. As his history is intimately connected with that of the grand epic which he composed, it will be necessary to say a few words concerning the origin of the latter and the nature of the authorities from which it was compiled.

An epic poem, properly so called, is a collection of the ballads and songs, in which the memory of heroic deeds is always preserved in the earlier periods of a people's history, thrown by the rhapsodists into a connected and consecutive form. To become national and to take hold on the people's hearts it must contain nothing but the genuine national legends and traditions, and must have grown spontaneously. Many attempts have been made by poets of different nations to create a national epic, but they have always failed for the lack of the elements above referred to. Homer's *Iliad* and Virgil's *Æneid* are typical specimens of the real and spurious epic,—the former breathing in every line the true spirit of the Hellenic nation, and always rousing the national enthusiasm and appealing to the national feeling; the latter never having been regarded by the Latin race with any deeper feeling than that of admiration for its literary merits. The *Shahnamah* of Firdousí is perhaps the only exception of a poem produced by a single author, and at once taking its place as the national epic of the people. The nature of the work, the materials from which it was composed, and the circumstances under which it was written are, however, in themselves exceptional, and necessarily tended to this result. The grandeur and antiquity of the empire and the vicissitudes through which it passed, their long series of wars and the magnificent monuments erected by their ancient sovereigns, could not fail to leave numerous traces in the memory of so imaginative a people as the Persians.

With the assistance of neighboring princes and of many of the influential Dihkans, Mahmud collected a vast amount of materials for the work, and after having searched in vain for a man of sufficient learning and ability to edit them faithfully, and having intrusted various episodes for versification to the numerous poets whom he had gathered round him, he at length made choice of Firdousí. Firdousí had been always strongly attracted by the ancient Pehlavi records, and had begun at an early age to turn them into Persian epic verse. On hearing of the death of the poet Dakiki, he conceived the ambitious design of himself carrying out the work which the latter had only just commenced; and, although he had not then any introduction to the court, he contrived, thanks to one of his friends, Mohammed Lashkari, to procure a copy of the Dihkan Danishwer's collection, and at the age of thirty-six commenced his great undertaking. Abu Mansour, the governor of Tús, patronized him and encouraged him by substantial pecuniary support. When Mahmud succeeded to the throne, and evinced such active interest in the work, Firdousí was naturally attracted to the court of Ghaznin. At first court jealousies and intrigues prevented Firdousí from being noticed by the sultan; but at length

one of his friends, Mahek, undertook to present to Mahmud his poetic version of one of the well-known episodes of the legendary history. Hearing that the poet was born at Tús, the sultan made him explain the origin of his native town, and was much struck with the intimate knowledge of ancient history which he displayed. Being presented to the seven poets who were then engaged on the projected epic, Abu 'l Cásim was admitted to their meetings, and on one occasion improvised a verse, at Mahmud's request, in praise of his favorite Ayáz, with such success that the sultan bestowed upon him the name of Firdousí, saying that he had converted his assemblies into paradise (*Firdous*). During the early days of his sojourn at court, an incident happened which contributed in no small measure to the realization of his ambition. Three of the seven poets were drinking in a garden when Firdousí approached, and wishing to get rid of him without rudeness, they informed him who they were, and told him that it was their custom to admit none to their society but such as could give proof of poetical talent. To test his acquirements they proposed that each should furnish an extemporary line of verse, his own to be the last, and all three ending in the same rhyme. Firdousí accepted the challenge, and the three poets having previously agreed upon three rhyming words to which a fourth could not be found in the Persian language, 'Ansari began—

Thy beauty eclipses the light of the sun;  
Farrakhi added—

The rose with thy cheek would comparison shun;  
'Asjadi continued—

Thy glances pierce through the mailed warrior's joshun;  
and Firdousí, without a moment's hesitation, completed the quatrain—

Like the lance of fierce Giv in his fight with Poshun.

The poets asked for an explanation of this allusion, and Firdousí recited to them the battle as described in the *Shahnamah*, and delighted and astonished them with his learning and eloquence.

Mahmud now definitely selected him for the work of compiling and versifying the ancient legends, and bestowed upon him such marks of his favor and munificence as to elicit from the poet an enthusiastic panegyric, which is inserted in the preface of the *Shahnamah*, and forms a curious contrast to the bitter satire which he subsequently prefixed to the book. The sultan ordered his treasurer, Khojah Hasan Meimendi, to pay to Firdousí a thousand gold pieces for every thousand verses, but the poet preferred allowing the sum to accumulate till the whole was finished, with the object of amassing sufficient capital to construct a dike for his native town of Tús, which suffered greatly from defective irrigation, a project which had been the chief dream of his childhood. Owing to this resolution, and to the jealousy of Hasan Meimendi, who often refused to advance him sufficient for the necessities of life, Firdousí passed the later portion of his life in great privation, though enjoying the royal favor and widely extended fame. Among other princes whose liberal presents enabled him to combat his pecuniary difficulties, was one Rustem, son of Fakhr ed dauleh, the Deilamite, who sent him a thousand gold pieces in acknowledgement of a copy of the episode of Rustem and Isfendiar which Firdousí had sent him, and promised him a gracious reception if he should ever come to his court. As this prince belonged, like Firdousí, to the Shiah sect, while Mahmud and Meimendi were Sunnites, and as he was also politically opposed to the sultan, Hasan Meimendi did not fail to make the most



or this incident, and accused the poet of disloyalty to his sovereign and patron, as well as of heresy. Other enemies and rivals also joined in the attack, and for some time Firdousi's position was very precarious, though his preëminent talents and obvious fitness for the work prevented him from losing his post. To add to his troubles he had the misfortune to lose his only son at the age of thirty-seven.

At length the book was completed, and Firdousi intrusted it to Ayáz, the sultan's favorite, for presentation to him. Mahmud ordered Hasan Meimendi to take the poet as much gold as an elephant could carry, but the jealous treasurer persuaded the monarch that it was too generous a reward, and that an elephant's load of silver would be sufficient. Sixty-thousand silver dirhems were accordingly placed in sacks, and taken to Firdousi by Ayáz at the sultan's command, instead of the 60,000 gold pieces, one for each verse, which had been promised. The poet was at that moment in the bath, and seeing the sacks, and believing that they contained the expected gold, received them with great satisfaction, but finding only silver he complained to Ayáz that he had not executed the sultan's order. Ayáz related what had taken place between Mahmud and Hasan Meimendi, and Firdousi in a rage gave 20,000 pieces to Ayáz himself, the same amount to the bath-keeper, and paid the rest to a beer seller for a glass of beer (*fouka*), sending word back to the sultan that it was not to gain money that he had taken so much trouble. On hearing this message, Mahmud at first reproached Hasan with having caused him to break his word, but the wily treasurer succeeded in turning his master's anger upon Firdousi to such an extent that he threatened that on the morrow he would "cast that Carmathian (heretic) under the feet of his elephants." Being apprised by one of the nobles of the court of what had taken place, Firdousi passed the night in great anxiety; but passing in the morning by the gate that led from his own apartments into the palace, he met the sultan in his private garden, and succeeded by humble apologies in appeasing his wrath. He was, however, far from being appeased himself, and determined at once upon quitting Ghaznin. Returning home he tore up the draughts of some thousands of verses which he had composed and threw them in the fire, and repairing to the grand mosque of Ghaznin he wrote upon the walls, at the place where the sultan was in the habit of praying, the following lines:

"The auspicious court of Mahmud, king of Zabulistan, is like a sea. What a sea! One cannot see its shore, If I have dived therein without finding any pearls, it is the fault of my star, and not of the sea."

He then gave a sealed paper to Ayáz, begging him to hand it to the sultan in a leisure moment after twenty days had elapsed, and set off on his travels with no better equipment than his staff and a dervish's cloak. At the expiration of the twenty days Ayáz gave the paper to the sultan, who, on opening it, found the celebrated satire which is now always prefixed to copies of the *Shahnamah*, and which is perhaps one of the bitterest and severest pieces of reproach ever penned. Mahmud, in a violent rage, sent after the poet, and promised a large reward for his capture, but he was already in comparative safety. Firdousi directed his steps to Mazenderan, and took refuge with Rabous, prince of Jorján, who at first received him with great favor, and promised him his continued protection and patronage; learning, however, the circumstances under which he had left Ghaznin, he feared the resentment of so powerful a sovereign as Mahmud, who he knew already coveted his kingdom, and dismissed the poet with a magnificent present. Firdousi next repaired to Baghdad, where he

made the acquaintance of a merchant, who introduced him to the vizier of the caliph, El Cader Billah, by presenting an Arabic poem which the poet had composed in his honor. The vizier gave Firdousi an apartment near himself, and related to the caliph the manner in which he had been treated at Ghaznin. The caliph summoned him into his presence, and was so much pleased with a poem of a thousand couplets, which Firdousi composed in his honor, that he at once received him into favor. The fact of his having devoted his life and talents to chronicling the renown of fire-worshipping Persians was, however, somewhat of a crime in the orthodox caliph's eyes; in order, therefore, to recover his prestige, Firdousi composed another poem, of 9,000 couplets, on the theme borrowed from the Koran of the loves of Joseph and Potiphar's wife—*Yúsuf and Zuleikha*. This poem, though rare and little known, is still in existence—the Royal Asiatic Society possessing a copy. But Mahmud had by this time heard of his asylum at the court of the caliph, and wrote a letter menacing his liege lord, and demanding the surrender of the poet. Firdousi, to avoid further troubles, departed for Ahwaz, a province of the Persian Irak, and dedicated his *Yúsuf and Zuleikha* to the governor of that district. Thence he went to Kohistan, where the governor, Nasir Lek, was his intimate and devoted friend, and received him with great ceremony upon the frontier. Firdousi confided to him that he contemplated writing a bitter exposition of his shameful treatment at the hands of the sultan of Ghaznin; but Nasir Lek, who was a personal friend of the latter, dissuaded him from his purpose, but himself wrote and remonstrated with Mahmud. Nasir Lek's message and the urgent representations of Firdousi's friends had the desired effect; and Mahmud not only expressed his intention of offering full reparation to the poet, but put his enemy, Meimendi to death. The change, however, came too late; Firdousi, now a broken and decrepit old man, had in the meanwhile returned to Tús, and, while wandering through the streets of his native town, heard a child lisping a verse of his own satire, in which he taunts Mahmud with his slavish birth:—

"Had Mahmud's father been what he is now  
A crown of gold had decked this aged brow;  
Had Mahmud's mother been of gentle blood,  
In heaps of silver knee-deep had I stood."

He was so affected by this proof of universal sympathy with his misfortunes that he went home, fell sick and died. He was buried in a garden, but Aboul Casim Gourgani, chief sheikh of Tús, refused to read the usual prayers over his tomb, alleging that he was an infidel, and had devoted his life to the glorification of fire worshipers and misbelievers. The next night, however, having dreamt that he beheld Firdousi in paradise, dressed in the sacred color, green, and wearing an emerald crown, he reconsidered his determination; and the poet was henceforth held to be perfectly orthodox. He died in the year 411 of the Hegira (1020 A.D.), aged about eighty, eleven years after the completion of his great work. Mahmud had in the meanwhile despatched the promised hundred thousand pieces of gold to Firdousi, with a robe of honor and ample apologies for the past. But as the camels bearing the treasure reached one of the gates of the city, Firdousi's funeral was leaving it by another. His daughters, to whom they brought the sultan's present, refused to receive it; but, his aged sister, remembering his anxiety for the construction of the stone embankment for the river of Tús, this work was completed in honor of the poet's memory, and a large caravanserai built with the surplus.

FIRE. So general is the knowledge of fire and its uses that it is a question whether we have any authentic



instance on record of a tribe altogether ignorant of them. A few notices indeed are to be found in the voluminous literature of travel which would decide the question in the affirmative; but when they are carefully investigated, their evidence is found to be far from conclusive. The missionary Krapf was told by a slave of a tribe in the southern part of Shoa, who lived like monkeys in the bamboo jungles, and were totally ignorant of fire; but no better authority has been found for the statement, and the story, which seems to be current in Eastern Africa, may be nothing else than the propagation of fables about the Pygmies whom the ancients located around the sources of the Nile. Commodore Wilkes, commander of the United States exploring expedition, says that in Fakaafu or Bowditch Island "there was no sign of places for cooking nor any appearance of fire," and that the natives felt evident alarm at the sparks produced by flint and steel, and the smoke emitted by those with cigars in their mouths. The presence of the word *afi*, fire, in the Fakaafu vocabulary supplied by Hales, the ethnographer of the expedition, though it might perhaps be explained as equivalent only to solar light and heat, undoubtedly invalidates the commodore's supposition; and the Rev. Geo. Turner, in an account of a missionary voyage in 1859, not only repeats the word *afi* in his list for Fakaafu, but relates the native legend about the origin of fire, and describes some peculiar customs connected with its use. Alvaro de Saavedra, an old Spanish traveler, informs us that the inhabitants of Los Jardines, an Island of the Pacific, showed great fear when they saw fire—which they did not know before. But that island has not been identified with certainty by modern explorers. It belongs, perhaps to the Ladrões or Marianas Archipelago, where fire was unknown, says Padre Gobien, "till Magellan, wroth at the pilferings of the inhabitants, burnt one of their villages. When they saw their wooden huts ablaze, their first thought was that fire was a beast which eats up wood. Some of them having approached the fire too near were burnt, and the others kept aloof, fearing to be torn or poisoned by the powerful breath of that terrible animal." To this Freycinet objects that these Ladrone islanders made pottery before the arrival of Europeans, that they had words expressing the ideas of flame, fire, oven, coals, roasting and cooking. Let us add that in their country numerous graves and ruins have been found, which seem to be remnants of a former culture. Thus the question remains in uncertainty: though there is nothing impossible in the supposition of the existence of a fireless tribe, it cannot be said that such a tribe has been discovered.

It is useless to inquire in what way man first discovered that fire was subject to his control, and could even be called into being by appropriate means. With the natural phenomenon and its various aspects he must soon have become familiar. The volcano lit up the darkness of night and sent its ashes or its lava down into the plains; the lightning or the meteor struck the tree, and the forest was ablaze; or some less obvious cause produced some less extensive ignition. For a time it is possible that the grand manifestations of nature aroused no feelings save awe and terror; but man is quite as much endowed with curiosity as with reverence or caution, and familiarity must ere long have bred confidence if not contempt. It is by no means necessary to suppose that the practical discovery of fire was made only at one given spot and in one given way; it is much more probable indeed that different tribes and races obtained the knowledge in a variety of ways. We still find in different parts of the world the natives taking advantage of hot-springs, naphtha or petroleum wells, and accessible craters. In the island of Tanna, for instance,

there is a mountain to the west of Port Resolution which abounds in evidence of its volcanic character—in fissures, steam-jets, hot-springs, etc. The inhabitants, says the Rev. George Turner, have not the slightest apprehension of danger; their settlements are arranged so that their *murum* or public square occupies one of the "hot places of the mountain; and there they lounge and enjoy the subterranean heat. Some of the springs reach the boiling point. Every day women may be seen cooking vegetables in artificial pits which form a series of never failing boiling pots. In some places the men or boys have only to stand on the rocks, spear their fish, and pitch them behind into the hot-springs." Similar accounts are given of the Maories in New Zealand, and the Negritos in the New Hebrides.

It has been asserted of many tribes that they would be unable to rekindle their fires if they were all allowed to die out. Travelers in Australia and Tasmania depict the typical native woman bearing always about with her a burning brand, which it is one of her principal duties to protect and foster; and it has been supposed that it was only ignorance which imposed on her the endless task. This, however, is not so certain; for Mr. Miklucho MacLay remarks of the Papuans, whom he has closely studied, that though they know how to produce fire, they prefer to carry it about. It was one of the distinguishing marks of the Samoan noble that his fire was never permitted to go out; and his attendants had a special name from their business of watching it while he slept. In Corea the preservation of the ancestral fire is still regarded as of the first importance for the happiness of a family, and the same belief has had a very extensive sway in other parts of the world.

The methods employed for producing fire vary considerably in detail, but are for the most part merely modified applications of concussion or friction. Sir John Lubbock has remarked that the working up of stone into implements must have been followed sooner or later by the discovery of fire; for in the process of chipping, sparks were elicited, and in the process of polishing, heat was generated. The first or concussion method is still familiar in the flint and steel, which has hardly passed out of use even in the most civilized countries. Its modifications are comparatively few and unimportant. The Alaskans and Aleutians take two pieces of quartz, rub them well with native sulphur, strike them together till the sulphur catches fire, and then transfer the flame to a heap of dry grass over which a few feathers have been scattered. Instead of two pieces of quartz the Eskimos use a piece of quartz and a piece of iron pyrites. Mr. Frederick Boyle saw fire produced by striking broken china violently against a bamboo, and Bastian observed the same process in Burmah, and Wallace in Ternate. In Cochin China two pieces of bamboo are considered sufficient, the silicious character of the outside layer rendering it as good as native flint. The friction methods are more various. One of the simplest is what Mr. Tylor calls the stick and groove—"a blunt pointed stick being run along a groove of its own making in a piece of wood lying on the ground." Much, of course, depends on the quality of the woods and the expertness of the manipulator. In Tahiti Mr. Darwin saw a native produce fire in a few seconds, but only succeeded himself after much labor. The same device was employed in New Zealand, the Sandwich islands, Tonga, Samoa, and the Radack islands. Instead of rubbing the movable stick backward and forward, other tribes make it rotate rapidly in a round hole in the stationary piece of wood—thus making what Mr. Tylor has happily designated a fire-drill. This device has been observed in Australia, Kamchatka, Sumatra, and the Carolines, among the Veddans of Ceylon,



throughout a great part of Southern Africa, among the Eskimo and Indian tribes of North America, in the West Indies, in Central America, and as far south as the Straits of Magellan. It was also employed by the ancient Mexicans, and Mr. Tylor gives a quaint picture of the operation from a Mexican MS.,—a man half kneeling on the ground is causing the stick to rotate between the palms of his hands. This simple method of rotation seems to be very generally in use; but various devices have been resorted to for the purpose of diminishing the labor and hastening the result. The Gaucho of the Pampas takes "an elastic stick about eighteen inches long, presses one end to his breast and the other in a hole in a piece of wood, and then rapidly turns the curved part like a carpenter's center-bit." In other cases the rotation is effected by means of a cord or thong wound round the drill and pulled alternately by this end and that. In order to steady the drill the Eskimo and others put the upper end in a socket of ivory on bone which they hold firmly in their mouth. A further advance was made by some of the North American Indians, who appear to have applied the principle of the bow-drill; and the still more ingenious pump-drill was used by the Iroquois Indians.

It has long been known that the rays of the sun might be concentrated by a lens or concave mirror. Aristophanes mentions the burning-lens in *The Clouds*, and the story of Archimedes using a mirror to fire the ships at Syracuse is familiar to every school-boy. If Garcilasso de la Vega can be trusted as an authority, the Virgins of the Sun in Peru kindled the sacred fire with a concave cup set in a great bracelet. In China the burning-glass is in common use.

Human culture may be said to have begun with fire, of which the uses increased in the same ratio as culture itself. To save the labor expended on the initial process of procuring light, or on carrying it about constantly, primitive men hit on the expedient of a fire which should burn night and day in a public building. The Egyptians had one in every temple, the Greeks, Latins and Persians in all towns and villages. The Natchez, the Mexicans, the Mayas, the Peruvians, had their "national fires" burning upon large pyramids. Of these fires the "eternal lamps" in the synagogues, in the Byzantine and Catholic churches may be a survival. The "Regia," Rome's sacred center, supposed to be the abode of Vesta, stood close to a fountain; it was convenient to draw from the same spot the two great requisites, fire and water. All civil and political interests grouped themselves around the Prytaneion, which was at once a temple, a tribunal, a town-hall and a gossiping resort; all public business and most private affairs were transacted by the light and in the warmth of the common fire. No wonder that its flagstones should become sacred. Primitive communities consider as holy everything that insures their existence and promotes their welfare, material things, such as fire and water, not less than others. Thus the Prytaneion grew into a religious institution. And if we hear a little more of fire worship than of water worship, it is because fire, being on the whole more difficult to obtain, was esteemed more precious.

We have curious and concordant testimonies that the principal functions of the state itself grew out of the care which was bestowed on the tribal fire. The men who attended it in Hellas were called the Prytanes. They had to eat together, and it would have been considered as a bad omen if they had neglected that duty. They were fed at the public expense; and well they might be, for, having been, probably, general cooks at the outset, they became, when the city was established, *Archontes*, or magistrates, and even *Basileis*, or a combination of the captain, the priest and the king. Thus

the first guardians of the tribal fire were the earliest public servants, who, by degrees, appropriated all important offices as the state itself developed into a vast aggregation of interests. And when Augustus usurped the Roman empire, he assumed all the powers which a pristine board of flamens, or of Prytanes, may have possessed. He made himself *Pontifex Maximus*, and assumed the charge of the public fire; and, on transporting it to his own palace, he had to convert it into public property. The Hellenic nations, as well as the Aztecs, received ambassadors in their temples of fire, where, as at the national hearth, they feasted the foreign guests. The Prytaneion and the state were convertible terms. If by chance the fire in the Roman temple of Vesta was extinguished, all tribunals, all authority, all public or private business, had to stop immediately. The connection between heaven and earth had been broken, and it had to be restored in some way or other—either by Jove sending down divine lightning on his altars, or by the priests making a new fire by the old sacred method of rubbing two pieces of wood together, or by catching the rays of the sun in a concave mirror. No Greek or Roman army crossed the frontier without carrying an altar where the fire taken from the Prytaneion burned night and day. When the Greeks sent out colonies the emigrants took with them living coals from the altar of Hestia, and had in their new country a fire lit as a representative of that burning in the mother country. Not before the three curiæ united their fires into one could Rome become powerful; and Athens became a shining light to the world only, we are told, when the twelve tribes of Attica, led by Theseus, brought each its brand to the altar of Athene Polias. All Greece confederated, making Delphi its central hearth; and the islands congregated around Delos, whence the new fire was fetched every year.

According to a not impossible theory, all architecture, public and private, sacred and profane, began with the erection of sacred sheds to protect the sacred fire, which abodes men dared to inhabit only after a length of time. For it must be borne in mind that fire was looked upon as a divinity. We are expressly told that Vesta had no image or statue even in her own temple, the Vestal fire being considered as the very goddess herself. The husbandman who ate their repast before the hearth believed, as Ovid relates, that they sat in the presence of the gods themselves. The hearth fire was kept holy, its flame was to remain bright and pure. The minute and irksome prescriptions of the Zend-Avesta carried this feeling to the extreme; it was and it is still a widely spread belief that nothing unclean is to be thrown in the fire, that no indecent actions are to be committed before it. To spit in one's fire would be now considered in many places, in Albania, for example, as an unpardonable offense. The Galtchas of Ferghana, according to M. de Ujafalvy, are so reverential that they would not blow out a light lest they should render the flame impure with their breath; and a similar peculiarity was observed by Wood in Badakshan and by Khanikoff among the Tadjiks of Bokhara.

These lingering customs take us back to the time when every hearth was an altar. From the national Prythaneion a brand was given to each gens. When gentes grew out of the tribe, and subsequently when families grew out of the gentes, coals from the gentile sacrificial stone were given to every family. These three social organisms, the nation, the gens, the family, one merging into the other, had fire for their common symbol, and esteemed it as even the cause of their existence. The hearth was the very center of the house,



as the *regia* was the sacred center of Rome and the Roman commonwealth; around the *regia* the civic and politic institutions developed themselves, and around the hearth the family grew slowly into shape and power.

The sun, as a source of heat, gives life to earth, and it was natural to suppose that the hearth, "the sun in the house," as the younger Edda calls it, radiated life likewise. Therefore it was made the seat of the Lares and Penates, or ancestors, a dwelling-place for the deceased, where a stock of souls ready to enter existence by new births was maintained. The famous Roman legend of Servius Tullius, whom Plutarch and other writers report to have been procreated in the ashes of the hearth by the Lares themselves, is a curious illustration of this belief. A sepulchral picture at Orvieto represents a double phallus protruding from the flame of a hearth, on which a libation is being poured. The Vedas taught that the hearth-fire was consubstantial with the cause of generation. Hence care was taken to preserve the purity of descent in the kin by preserving the flame of the hearth pure and unmingled with fire taken from another house. On this matter the ancient Persians were particularly punctilious, feeding their fires, and especially their sacred fires, only with certain kinds of wood, reputed to be cleaner than all others, well dried, and well stripped of the bark. Everywhere and in all countries, it was considered a most fatal omen if the fire died out in the hearth. The family whose fire went out had incurred the ire of the Lares, who, if not quickly appeased, would strike the sons with impotence and imbecility. A new fire was to be lit by the friction of two twigs, as to fetch some from a neighbor's would have been considered an adulterous union of hearths, an undue mingling of two families' blood.

For a long time, throughout all the world, the ancient naturalists who meditated on the greatest wonder of physiology, supposed that the generation of fire by the friction of two woods, one of harder the other of softer substance, was the exact counterpart of human generation. The heat thus evolved in the human organism was held to be of most subtle nature, a flash of the astral light, an intelligent substance. Primary fire impregnated primary water, and the soul was born. Life was compared to a flame, to a torch; and no comparison is more true. Modern chemistry having proved that animal life is a constant burning of oxygen, the ancient myth was not far from the truth when it said that Prometheus animated the figure of clay by putting into it a spark of fire. "Know ye," said an Ojibway prophet, "that the fire in your huts and the life in your bodies are one and the same thing."

The opinions and beliefs which most primitive populations have entertained on the nature of fire in the hearth were applied by them to the great cosmic fire; both were life-givers, one to the family, and the other to the universe; both were parts of the same substance or element. It was taught by Aristotle that Zeus was a name given to the fire of heaven, and by Plato and Euripides that the same Hestia burned in the humblest hut and the highest sky. Ovid went so far as to identify that goddess with the earth itself. According to that doctrine, fire was held to be the very soul of nature, the essence of everything that had a shape, and even to be the giver of that shape, for philosophers explained that of all elements none but fire having any form by itself could impart it to other things. From Jupiter to the fly, from the wandering star to the tiniest blade of grass, all beings owed existence to the fiery element. This theory, more or less distinctly expressed, obtained among the Aztecs, who invoked in their prayers "fire the most ancient divinity, the father and mother of all

gods." Tohil the Quiche, Quetzacoatl the Mexican, Tiermes the Finn, Perkun the Slav, Thor the Scandinavian, Taranis the Gaul, and many other gods, as stated above, were represented as having firestones for heads or for bodies; one of them was said to have flashed up in lightnings as he was dragged along the rocky heavens by some powerful antagonist. Such a god, encased in a shell of flint, fell down from heaven upon earth, according to an Indian legend; the shell broke into sixteen hundred fragments, and each of them arose and stood up as a particular god. From such a thunderbolt or meteorite the Dakotas boasted to have originated.

In the Gnostic theory the middle part of the cosmos was taken up by the starry world, emitting the astral light, inferior in sanctity to the mild effulgence of ether above it, but superior in vivifying properties to our common fires. These three conditions of the cosmic fire corresponded to the three component parts of man — mind, soul and body. Prophets and other great and pious men had minds still refulgent with ethereal rays, which were the thoughts of divinity; while the wicked had souls which had been soaked in a smoky fire, and in stupid people there glimmered but the weakest possible ray of celestial light.

It was not the hottest fire which was supposed to be the most divine. Fierce heat being inimical to organic life, hot fires are said to be hellish ones. Their masters, the demons of drought and sterility, dry up the fountains, scorch the grass, excite pestilence, and are the worst friends to the human race. Pure light was thought to be without any heat at all, and legends tell of "theophanias," of aureoles, of fiery tongues flickering above the candles of infants predestined to glorious careers. Phallic fire, giving out heat but no light, was often considered as of an inferior nature, and therefore represented by secondary or even by tertiary deities, fauns, satyrs, ægipans, and the like.

The principle of life being a fiery one, it was supposed that all maladies were only so many defilements of the pure principle which had been darkened by the demons of night, and that all sick people were demoniacs. The traditions of the Finns assert that lightning, the fiery sword of Ukko, slays the demons of illness. But it was discovered that the exhibition of lightning, as a healing method, was attended with grave drawbacks; it was impossible to insure being able to use it, and when it could be obtained, the cure was worse than the disease, as the patient was killed before the imp who had bedeviled him. It became necessary to have recourse to a substitute; and therefore the healing virtues of the thunderbolt were embodied in the *Keraunia* or thunderstones. The "holy stones" of the Anglo-Saxons, or "holed stones," arrow heads, flint celts, and flint knives worked by prehistoric men, were popularly believed to be stones which, falling down from heaven, possessed heavenly virtues, and were of use in all sorts of disease.

Purification by fire led to the institution of baptism by fire, which in many places was thought vastly superior to baptism by water; and the idea obtained its furthest development in the notion of purgatorial fires, which is not peculiar to one church. Often people had misgivings about the penance which awaited them in a future state, and reckoned that it would be better for them to undergo it on this side the grave.

Because the sun loses its force after noon, and after midsummer daily shortens the length of its circuit, the ancients inferred, and primitive populations still believe, that, as time goes on, the energies of fire must necessarily decline. Therefore men set about renewing the fires in the temples and on the hearth on the longest day of



summer or at the beginning of the agricultural year. The ceremony was attended with much rejoicing, banqueting, and many religious rites. Houses were thoroughly cleansed; people bathed, and underwent lustrations and purifications; new clothes were put on; quarrels were made up; debts were paid by the debtor or remitted by the creditor; criminals were released by the civil authorities in imitation of the heavenly judges, who were believed to grant on the same day a general remission of sins. All things were made new; each man turned over a new page in the book of his existence. Some nations, like the Etruscans in the Old World, and the Peruvians and Mexicans in the New, carried these ideas to a high degree of development, and celebrated with magnificent ceremonies the renewal of the *sæcula*, or astronomic periods, which might be shorter or longer than a century.

Having considered fire in its religious and beneficent aspect, we now come to speak of it as a destructive agent.

No means at present exist for accurately estimating the average annual loss of property by fire throughout the world, as in scarcely any country is an official record of fires and their results kept; and the imperfect returns of insurance companies are of comparatively little significance. It is estimated that the value of the insured property destroyed by fire all over the world amounts to from \$150,000,000 to \$200,000,000 annually. (See INSURANCE.)

**FIRE EXTINCTION.**—In coping with fires, water is the great agent employed; and in towns where the supply of water is abundant, and where especially there is a constant and high pressure in the mains, the task of the firemen is much simplified.

*Hand-Pump and Bucket.*—A small hand-pump which can be set into a bucket of water is the most effective means of distributing a small supply of water without waste. If judiciously used it will put out any fire in its earlier stages.

*The Portable Chemical Extinguisher*, designed to answer the same purpose as the hand-pump and bucket, is now in extensive use in factories, warehouses and public buildings. The vessel is a cylindrical tank, holding seven gallons or upward of water, and is carried on the back. Carbonic acid is generated at the moment of using within the vessel itself, and from its compressibility affords the power which projects the liquid. The working pressure varies from 70 to 120 lbs. per square inch, according to the temperature of the surrounding atmosphere; and the projectile range of the jet is from forty to fifty feet.

*Hand-worked Engines* consist essentially of a pair of single-acting force-pumps mounted on wheels and worked by hand. They vary much in size, weight and power, and are hauled by men or horses.

*Steam Fire-Engines* are essentially a pair of single-acting suction and force pumps driven by steam power. They are hauled by two horses, or are self-propellers. They weigh, as drawn to fires, from 5,000 to 8,000 lb. The boilers are tubular, of sufficient capacity to work the pumps 500 strokes per minute. The usual working pressure of steam is 80 to 100 lbs. per square inch. These engines are of great power.

*Chemical Engines* are of several forms and sizes. The size most used consists essentially of two cylindrical copper or steel tanks, each holding eighty gallons of water.

*Ladder Carriages* carry from twenty to twenty-five ladders of various lengths. Two ladders spliced reach seventy feet. The carriage fully equipped and carrying twelve men weighs from 7,000 to 8,000 lb., and is drawn by two horses. The "aërial ladder" (so-

called) reaches when fully extended a height of 100 feet, and is self-supporting; it is readily moved when raised. It is made in eight sections, each being a ladder about twelve feet long, and is put together and raised in six minutes. It is available as a fire-escape. The total load with its carriage is about 6,000 lb.

*Electric Fire-Alarm Telegraph.*—Time is a most important element in all fires, and the purpose of this telegraph is to put it in the power of any one discovering a fire to make known the locality of it to the fire department in the shortest possible time. Throughout the town or city "alarm boxes" are placed, connected by telegraph wire with the central office and all the stations of the department. They are small iron boxes about a foot square, numbered in order and placed conspicuously on telegraph poles, or on the side of a building at corners of streets. Inside of each is a simple clock-work, which is set in motion by the pulling of a handle, and which records at the central office the number of the box. To guard against false alarms the outer door of the box is locked, but keys are kept at hand and are in the possession of all policemen and firemen.

The *Automatic Signal Telegraph* gives instantaneous notice at the headquarters of the fire department, or at the nearest engine-house, of the existence of a fire, by the action of the fire itself, and records there the number of the building, and the room in which it occurs. The apparatus is very simple, and may be fully relied on. It consists of a small tube, called a thermostat, about three inches long, containing a spiral strip of metal, so arranged that the expansion due to a rise of thirty degrees above the ordinary temperature of the room in which it is placed, will close the connection between the two poles of a battery, and produce an electric current, which, passing through a small iron box containing a clock-work and circuit breaker, called a "transmitter," at once strikes a bell, and starts a register at the nearest station of the fire department, which records the number of the building and room in which the fire has broken out. The thermostat is placed upon the ceiling of each room at intervals of twenty-five feet throughout the building, the transmitter in every room that requires a separate signal. The signal is transmitted even when the wires are broken. This telegraph has been adopted in many American cities.

**ORGANIZATION.**—The organizations of Paris and Berlin are based upon the idea of small detachments of men, lighter machines, and a large number of stations, and on the presumption that no fire will have got beyond the control of the small detachment before it is discovered and made known. The results have been generally satisfactory under the conditions existing in those cities. In London larger detachments and fewer stations have given good results. In the principal cities of the United States different conditions have necessitated a proportionately larger force of men and more effective appliances.

*London.*—The metropolitan fire brigade is a force of about 400 men under the control of the Board of Works, but under the immediate command of the "chief officer." The city is divided into a number of districts, each under a "superintendent." Within each district are fire-engine stations properly equipped, each under an "engineer."

*Paris.*—The firemen are a corps, "sapeurs-pompiers," attached to the War Department, but at fires the corps acts under orders from the prefect of police. It is under the immediate command of a colonel, and is divided into twelve companies, the company being the unit of organization. Fire stations, manned by three men and provided with hand-pumps and fire-escapes, are distributed throughout the city.



*Berlin.*—The department is subject to military discipline, and is under the command of a "fire-director," with subordinate officers. The city is divided into four inspection districts, with an officer in charge of each. Each district has numerous fire depots, according to its needs, and each depot is in charge of a fireman and four men, and is furnished with a small hand-engine, a hook and ladder, and a fire-escape. The principal stations are connected by telegraph.

*New York.*—The fire department of New York is under the control of a board of commissioners appointed by the mayor. The active force is under the immediate command of the "chief of department," and consists of ten battalions, each of six companies, in all about 770 men. Each company, whether engine or ladder company, has its own house, where the men live and apparatus is kept. The whole force is at all times on duty and in the houses, except such small detachments as are on street patrol or at their meals. The horses stand harnessed in their stalls, which are placed immediately in the rear of the engine, and are loosened by a simple mechanical appliance which, simultaneously with the striking of the alarm, opens the front of the stall; the horses, trained to move at the sound of the gong, advance rapidly each to his own place at the pole. They are instantly hitched in, the men spring to their seats, and the carriage is driven at high speed to the "alarm box" from which the alarm was given. To make sure that there will be a working pressure of steam on reaching the fire, the water in the engines, as they stand in the houses, is kept always at boiling point by the circulation of hot water from small stationary boilers, and fire is lighted in the engine the instant it leaves the house. Every effort is made to save even a few seconds of time, so that the interval between sounding the alarm and pumping water on the fire will average three minutes, and rarely exceeds five minutes. The city is divided into ten battalion districts. The smallest of these represent each an area of about 5,000 by 2,000 feet, and comprise the most exposed parts of the city; but most of the districts are from two to three times as large. The signal boxes of the electric fire-alarm telegraph are placed conspicuously in the streets about 400 feet apart in the more crowded portion of the city, and from 1,000 to 2,000 feet in other portions. There are 540 in all. Alarms given from these boxes are instantly telegraphed from the headquarters of the department to each company house in the city. The first alarm calls out two or more companies previously designated; a second and third call out additional force.

*Chicago.*—The fire department of Chicago may be taken as the type of the best system now employed in the United States. It is on a military basis, under the control of a fire marshal, appointed by the mayor, by and with the advice and consent of the city council, who holds his office for two years.

The fire marshal's staff consists of a first assistant fire marshal, assistant fire marshal, and secretary, superintendent of city telegraph, fire inspector, and thirteen assistant marshals in charge of battalions. The active force consists of 842 men, forming fifty-six engine companies, twenty-one hook and ladder companies, two chemical engine companies, and (in remote districts) five hose companies, grouped into thirteen battalions. The apparatus consists of two fire boats, one water tower, sixty steam fire engines, sixty-six hose carts, carriages and wagons, twenty-four hook and ladder trucks, sixteen chemical engines, four manual engines, 100,000 feet of hose, and 360 horses, besides portable pumps, chemical extinguishers, etc. Each company has its own house where the men live and the apparatus is kept. The men are on duty at all times, day and night, only one man in

each company being allowed leave of absence at a time. Each engine, when at quarters, is connected with a stationary boiler, which keeps the water at the boiling point, fire in the engine being lighted the instant it leaves the house. In front of each engine, truck and hose cart, hangs the harness suspended on an automatic device, ready to drop into position the moment the horses are in their places.

An alarm of fire releases the horses from their stables, and they are trained to instantly take their places, the men slide down brass poles from their apartments above, and, in ten seconds, or less, from the first tap of the bell, the company is ready to start. With the men in bed, and the horses in their stables, the average time necessary to hitch to apparatus, leave house, run 400 feet, attach to hydrant, run out 150 feet of hose, and throw a stream seventy-five feet, is two minutes.

The city telegraph system embraces 728 fire-alarm boxes, and 892 police boxes, making 1,620 boxes from which alarms of fire can be sent. In the thickly settled districts, keyless boxes are used, which, when opened, sound a gong to attract attention, and deter persons from sending in an alarm wantonly or maliciously. In the more remote portions of the city, a key is required to open the box. An alarm is given by pulling down a hook on the interior of the box, which causes the number of the box to be transmitted to headquarters. Each company is provided with a list of boxes to which it responds on first and succeeding alarms. A first alarm calls for an average of four engine companies and two hook and ladder companies, and a second and third alarm for five engine companies and one hook and ladder company. Should more be found necessary, a "special call" is made for the number required.

**FIRE-CLAY, FIRE-BRICKS.** Fire-clays may be defined as native combinations of hydrated silicates of alumina, mechanically associated with silica and alumina in various states of subdivision, and sufficiently free from silicates of the alkalis and from iron and lime to resist vitrification at high temperatures; the absence of the vitrified element is, however, merely a question of degree, as no native clays are wholly free from iron, the alkalis, lime, and the other alkaline earths.

Fire clay may be looked upon as a special term for the gray clays of the Coal-Measures, intensified with, and generally in close proximity to, the seams of coal, in beds varying from a few inches to many yards in thickness. They are locally known as "clunches" and "underclays," and are supposed to represent the soil that produced the vegetation from which the coal was formed.

**FIRENZUOLA, AGNOLO**, Italian poet and littérateur, was born at Florence, September 28, 1493. The family name was taken from the town of Firenzuola, situated at the foot of the Apennines, its original home. The grandfather of Agnolo had obtained the citizenship of Florence and transmitted it to his family. Agnolo was destined for the profession of the law, and pursued his studies first at Siena and afterward at Perugia. His writings, of which a collected edition was published in 1548, are partly in prose and partly in verse, and belong to the lighter classes of literature.

**FIREWORKS.** See PYROTECHNY.

**FIRMICUS, MATERNUS JULIUS**, the name of a Latin writer, and most probably of two, who lived in the reign of Constantine and his successors. About the year 347 one of them composed a work entitled *De Erroribus Profanarum Religionum*, which he inscribed to Constantius and Constans, the sons of Constantine, and which is still extant. During the life of Constantine a person of the same name as the author of the work on Christianity commenced his eight books on astronomy,



which were not completed however till 354 B.C. They were first printed by Aldus Manutius in 1501, and have been reprinted several times since. The work is inter-fused with Neo-Platonic philosophy, and its spirit is hostile to Christianity.

FIROZPUR, or FEROPZEPOR, a district of British India in the Lahore division or commissionership under the jurisdiction of the lieutenant-governor of the Punjab.

FIROZPUR, the civil headquarters of the district of the same name, also a military cantonment, is situated on the old bank of the Sutlej. Population, 22,000.

FISCHART, JOHANNES, the great German satirist of the sixteenth century, was born probably at Strasburg (according to some accounts at Mainz) in 1546, and was educated at Worms, in the house of Kaspar Scheid, whom he mentions in the preface to his *Eulenspiegel* as his "cousin and preceptor." After taking the degree of Doctor der Rechte at Basel in 1570, he left Germany for a time, and is said to have traveled in Italy, the Netherlands, France and England. Having returned to Strasburg, he lived there from 1576 to about 1580, with his brother-in-law the printer, Bernhard Jobin, who became the publisher of most of Fischart's works. He died in 1590.

FISHER, JOHN, bishop of Rochester, was born at Beverley in Yorkshire, but the year of his birth is uncertain, some placing it in 1459, others in 1461, and others in 1465. He has been erroneously credited with the composition of the *Assertio Septem Sacramentorum*, in which Henry VIII. attacked the heretic Luther, and for which the pope conferred upon his majesty the title of "Defender of the Faith." Sir Thomas More and Fisher, however, published their respective rejoinders to the Reformer's reply to the king. Hitherto he had retained the friendship and esteem of the king; but from 1527 till his death he was acknowledged as, next to Sir Thomas More, the most influential man of the anti-royal or papal party in England. He published a pamphlet against the divorce of Catherine of Aragon, which was widely disseminated on the Continent, and also secretly circulated in England. In 1533 the parliament found him guilty of misprision of treason, for concealing certain prophetic speeches of Elizabeth Barton, a fanatical impostor known as the Holy Maid of Kent, relative to the king's death, and condemned him, with five others, to suffer loss of goods and imprisonment during his majesty's pleasure. He was subsequently released upon payment of a fine of £300. Fisher excused his silence on the ground that the nun had told him that she had communicated her prophecies to Henry in person, yet he nevertheless refused to express regret for having been unwittingly connected with treasonable designs. As to the great question of the day, Fisher offered to swear to the succession in the line of Anne Boleyn's issue, but he refused to acknowledge either the validity of her marriage or the king's supremacy. For this refusal he was attainted by the parliament of 1534, and committed to the Tower. At this juncture Pope Paul III. sent him a cardinal's hat. This kindness, however, only hastened the bishop's ruin. He was beheaded at Tower Hill on June 22, 1535.

FISHERIES. In almost every part of the world fishes form some portion of the food of mankind, but they form a much more important part of the food-supply in the northern temperate regions than in the tropics or the southern hemisphere, and they are obtained in enormously greater abundance from the sea than from inland fresh waters. Hence it has become customary by a metaphor to speak of the 'harvest of the sea.' It is only within the last century, if we except the fish-ponds of the medieval monasteries and the culture of fresh-water fishes in China, that attempts have

been made to control the conditions under which valuable fishes live and multiply. It is impossible in most cases to feed and protect aquatic animals with the same completeness as domesticated land animals. The cultivation of the former consists chiefly in artificially securing the production of large numbers of young, then setting them at liberty, and endeavoring to promote an abundant supply of their natural food, to destroy their enemies, and remove all unfavorable conditions. In this way the supply of salmon and some other fish and of oysters has been in some places largely increased—oysters especially in France and Holland, salmon and other fish chiefly in the United States. But no exclusively marine species has yet been successfully cultivated on a scale large enough to be of practical importance, and it is still an open question whether scientific methods can be applied to increase the supply of valuable marine fish diminished by excessive fishing.

But although marine fishes are produced in enormous abundance without human aid or foresight, the amount of labor and capital required to capture them is very large. Sea-going vessels and boats are themselves costly machines, and other elaborate and expensive machinery has to be carried and worked on board of them; the vessels and gear have to sustain very hard wear; both are frequently damaged, the gear being often, and the vessels sometimes, lost altogether. The capture of fish and their consumption have enormously increased in Europe and North America since the beginning of the age of steam. This increase is due to the great increase of population, and the consequently increased demand for cheap and palatable food, and to the facility afforded by the railways for conveying fresh fish to the large inland towns.

Nearly all the most abundant marine fish on the coasts of Europe and North America are valuable as food, some being held in great estimation as delicacies by the rich, others forming a staple food of the poor. The chief exceptions are the dog-fishes, which are extremely abundant and at the same time of no value as food, although they are occasionally eaten in some places on the coast. The other most valuable marine animals on the European coasts are the lobster, crab, crayfish, shrimps, and prawns among Crustacea, and certain molluscs, chiefly the oyster, though mussels, clams or scallops, and whelks are of some value. Except in extensive fresh-water lakes, true fresh-water fishes are of minor importance, but there are several valuable 'anadromous' fish which ascend rivers to a greater or less distance. The most important of these are the salmon and sea-trout, but the smelt and shad are abundant in some estuaries of Europe, and another species of shad (*Clupea sapidissima*) is abundant and highly valued in America. Eels also are largely eaten in Europe, and the sturgeon is abundant in some large rivers of the continent.

The following are the principal different kinds of sea-fishing carried on: (1) trawling, (2) line fishing, (3) drift-net fishing, (4) seine-net fishing, (5) moored-net fishing, (6) crab and lobster fishing, (7) oyster-dredging.

(1) *Trawling* here means fishing with the beam-trawl, which is a triangular bag-like net towed along the sea-bottom. The mouth of the trawl-net is attached to a frame, consisting of a long wooden beam supported by a triangular hoop of iron at each end. These trawl-heads, or runners, glide along the ground, and raise the beam three to four feet above it. The upper side of the net is attached to the beam, the sides to the trawl-heads, while the lower edge of the mouth of the net is formed by a thick and heavy rope which is a great deal longer than the beam, and thus lies on the bottom between the irons in a deep curve or bight. As



the net is towed along, the ground-fish are disturbed, and rise above the foot-rope, and, being prevented from escaping by the upper side of the net, they are swept into its narrow end, where their escape is made still more difficult by a constriction of the cavity of the net somewhat in front of its closed end. The size of the trawl varies according to the size of the vessel working it, but for deep-sea fishing the beam is thirty-six to fifty feet long, and the mesh of the net is always about four inches at the mouth to one and one-half inch at the 'cod' end. The trawl is towed by means of two 'bridles,' which are long ropes of equal length attached one to each trawl-head, and a very strong, thick rope, the 'warp' or 'rode,' the end of which is fastened by a shackle to the two bridles.

The majority of trawling vessels are sailing boats, but recently steamers have been used in several places, especially in Scotland. The sailing boats range from thirty to eighty or even 100 tons register. Both on the east and south coast they were formerly all cutter-rigged; but this was when the maximum size did not exceed fifty tons. The larger vessels on the east coast are now ketch-rigged, carrying two masts each with gaff sails. On the southwest coast there are very few vessels over fifty tons. Most are cutter-rigged; though some have been converted to the other rig, which is much more economical in working, and safer in bad weather. The trawl is always carried along the rail or bulwarks on the port quarter, extending from the main rigging or a little behind it to the taffrail. When the trawl is 'shot,' it is towed from either the port or starboard quarter, according to the wind and tide. On the south coast the trawling rope is usually hauled in over the bows by a hand-winch, the after-bridle being finally wound in by a smaller winch aft. But on the east coast the boats are fitted with patent capstans by which the rope can be hauled in amidships, and these capstans are now almost always worked by steam.

The principal fish caught in the trawl are all kinds of flat-fishes—viz., halibut, turbot, brill, soles, plaice, flounders, dabs, and other less familiar forms called by different names in different places, such as lemon soles or merry soles, megrims, witches; also skates and rays, which are bottom-fish of a flattened shape but of a different class; and all kinds of round-fish, or, as they are sometimes called, white fish, which feed to a great extent on the sea-bottom, such as cod, haddock, whiting, pouting, pollack, coal-fish, hake, ling; and also other miscellaneous species, as gurnards, red mullet, bass, sea-breams, dorys, and conger.

(2) *Hook and line fishing* is of two kinds—that carried on by hand-lines, and that by long lines. Long lines, again, vary in length and the size of the hooks, according to the fish sought. Thus, off the east coast of Scotland large-sized boats go long distances from land to 'shoot' lines of very great length with hooks of large size, and catch cod, ling, halibut, skates, and rays, turbot and coal-fish (*Gadus carbonarius*). Smaller boats fish at shorter distances, with similar lines and smaller hooks, for haddock. This latter fishery is regularly carried on all along the east coast of Scotland, and forms the principal occupation of the smaller boats. The lines are always baited with mussel, and the hooks are always baited on shore by the wives and children of the fishermen. The baiting is done in a very careful and skillful manner. Each man of a crew contributes a certain number of lines of his own; each line when ready to go to sea is coiled up in a separate basket, made of wicker-work and very shallow—a creel. All the hooks are laid in the center of the coil, and as they are baited and placed in position fresh grass is scattered over them and among them, so that the bait remains moist until the

line is shot. When the ground is reached the boat is allowed to sail (or in some cases steam) steadily and gently along. A heavy stone attached to one end of a line is thrown overboard first, and attached to this stone is another line, long enough to reach to the surface, and fastened at its upper end to a flagstaff, buoyed and weighted so as to float upright in the water. The line is then taken overboard from the boat as she moves along. To prevent the hooks catching in the rail of the boat the line is made to pass over a thick metal cylinder which one of the crew holds in his hand. Before the whole of a line is run out another is fastened (bent on) to its end, so that all the lines are joined together, and stretch for two miles or so along the bottom of the sea. The line is always shot across the tide—i. e. transverse to the direction in which the tide is flowing, so that the short lines which fasten the hooks to the main line, at intervals of one fathom, are kept extended perpendicular to the main line. When the last line is shot another buoyed flagstaff is attached to the end of it, and the whole is left at the bottom for half an hour to an hour. Then the flagstaff last thrown overboard is picked up again, and the line is hauled in in the opposite direction to that in which it was shot. An occasional plaice or gurnard is caught on these lines, but the majority of the fish taken are haddocks. Many of the baits are taken by starfishes, whelks, crabs, etc., and a large number of the hooks in certain localities bring up specimens of the hag-fish, or borer, which has no jaws, but takes the hook down into its stomach. Thus a great many fish are caught in almost equal numbers by hook and by the trawl; but each kind of instrument has its limitations. Soles, for instance, are scarcely ever caught by the hook, though turbot, brill, and halibut are; the conger, on the other hand, is only occasionally taken in the trawl. Long lines can be shot on any kind of ground, and rough, rocky ground, where the trawl cannot be worked, is usually the most productive for long line fishing. All the fishes caught by these methods are predaceous forms, with large mouths, which feed either on the invertebrata of the sea-bottom, or on the migratory fish which swim in shoals, such as the herring and pilchard. The trawl can only catch those which are feeding on smooth ground, while the baited hook secures them on rough ground and in mid-water.

(3) *Drift-nets* are oblong nets fastened together in a long series, buoyed above so as to float vertically in the sea. The series of nets or 'fleet,' as it is called, is fastened at one end by a rope to the boat from which it is worked, and nets and boat 'drift' or 'drive' with the tide. The nets are shot at right angles to the current of the tide, and those fish which swim in shoals in the upper waters of the sea strike against them in their course, or when carried along by the tide; and, their heads passing through the meshes, the fish can neither swim forward, because their bodies are too large to pass through the meshes, nor backward, because their gill-covers are then caught by the string of the net. These nets are used to capture herring, mackerel, and pilchard. For pilchards the nets have a mesh of thirty-six to thirty-eight to the yard.

Mackerel-nets have a larger mesh—viz., only twenty-five or twenty-six meshes to the yard, and also are worked differently. The 'back' of the nets is kept at the surface of the sea, floats being fastened directly onto it, and a separate rope called the 'foot-line' is connected to the 'back' of each net by a long connecting-line. The foot-line therefore sinks to some distance below the bottom of the nets. The reason for this is that mackerel usually swim quite near to the surface of the water, and as the line running along the 'back' of the nets, being kept at the surface, is liable to be broken by



passing vessels, it is necessary that the nets should be attached to the foot-rope, which sinks to a safe distance, and by which the nets are hauled in.

(4) The *seine* is a single, continuous net, attached to a cork-line above and a leaded line below, and attached at each end by means of these lines to a long rope. In Britain the seine is always worked from the shore. It is shot from a rowing-boat in a large semicircle, and then by means of the two end ropes is hauled on shore, or the ends are brought together so as to inclose the fish. For catching pilchards on the coast of Cornwall very large seines are used, about 200 fathoms long and 10 fathoms deep at the deepest part. These nets are too large to be drawn on to the shore when they inclose a large number of fish; the ends are therefore brought together close to the shore and moored, and smaller seines are shot within the larger net to take out the fish as they are required. This kind of fishing is principally pursued at St. Ives. Smaller seines, called ground-seines, are used on the south coast for catching sprats and gray mullet, and are mostly worked in estuaries. The net used in England, Wales, and Ireland for catching salmon and sea-trout in public waters is a kind of a seine, and is worked by a boat called a coble.

(5) *Moored-nets* are of various kinds. Herring-nets, similar to those used in drifting, are moored in some places across the tide, the fish caught being taken out by means of boats every morning. A kind of moored beam-trawl, called a stow-net or bag-net, is used in estuaries—*e. g.*, in the upper parts of the Firth of Forth; the flowing or ebbing tide carries fish of various kinds into its mouth. The mouth of the net is attached by means of bridles to the same anchor which moors the boat from which the net is worked.

(6) *Crabs* and *lobsters* are taken in traps, which are usually dome-shaped cages made of wickerwork or netting stretched on a frame. Openings, in the form of funnels projecting into the interior of the trap, are situated either at its top or sides. The trap is baited with pieces of fish, and sunk by means of heavy stones attached to its bottom. These traps are called crab or lobster pots, and usually several of them are put down in a series attached to one another. Their position is marked by cork floats connected to the pots by a line long enough to reach to the surface, and by this line the pots are recovered.

(7) The *oyster-dredge* is like a small trawl, but the mouth is made by a rectangle of iron bands, and the net is usually made of iron rings linked together.

The whale-fisheries of the Arctic Ocean are not so important as they were at one time, the invention of gas and the discovery of other lubricants having rendered us independent of whale-oil. The success of the whale-fisheries has also fluctuated so much as to prevent modern capitalists from embarking very largely in the trade. The only novelties that distinguish the whale-fishery of the present day are the introduction of steam-whalers, and, in some instances, the practice of vessels wintering in Greenland; but, even with these advantages, British whalers barely pay their expenses, and the fishery, as compared with former years, exhibits a considerable falling-off. The total whaling fleet numbered at one time 159 ships, but to-day it barely amounts to a tenth of that number. The seal is now largely captured for the purpose of obtaining its oil; many thousands annually are killed by British sealers, as many as 15,000 being taken by the men of a single ship. Norway also fits out a number of steamers for the Arctic seal and whale fisheries. The South Sea or sperm-whale fishery is principally in the hands of the Americans, who pursue this branch of commerce most successfully.

The other European countries bordering the North

Sea and the Channel practice all the various methods of fishing pursued by British boats, and occasionally a certain amount of jealousy and friction arises between the men of different nationalities. Of extensive fisheries off the coast of Norway the most important are the cod-fishery of the Loffoden Islands (which is carried on both by hand-lines and by gill-nets like the drift-nets), and the herring drift-net fishery. Lobsters and mackerel are also taken by the Norwegians in considerable numbers, but their coasts are not adapted for trawling. The sardine-fishery, carried on by seines, occupies a large number of people on the south and west coasts of France, as well as on the west coast of Italy.

France and Holland both possess oyster-fisheries which are far more productive than those of Great Britain, and this is due in great measure to the science and care with which the oysters are cultivated. The principal seats of this industry in France are at the bays of Arcachon and Concarneau; in Holland, at the mouth of the Scheldt.

In the United States there is a very important seine-fishery for the shad, a species different from the European shad, which ascends the Hudson, Delaware, and Chesapeake in order to spawn. Soles and turbot do not exist on the American side of the Atlantic; but black-fish, weak-fish, blue-fish, porgies, the herring, the common mackerel, and another species, the Spanish mackerel, are very largely fished. There is also another valuable clupeoid, called the menhaden, much larger than the herring. The mackerel is captured by means of large seines worked out at sea from a large boat. The vessels engaged in this fishery are schooners of sixty to eighty tons, and the seine boat is launched from the vessel when a school of fish is sighted. A large number of mackerel are also taken in drift-nets, similar to those of Europe. The Newfoundland cod-fishery is extremely productive, and is prosecuted both by hook and line, and by seines worked at sea; on the Grand Banks the fishermen are mostly French, the inhabitants of Newfoundland, as of Canada generally, carrying on the more convenient and less risky inshore fishery. Both Canada and the United States possess valuable oyster-fisheries, and the oyster 'farms' of New York State—notably, since 1888, along the floor of Long Island Sound—are especially extensive; but the European oyster does not occur in America.

The most important fishery on the Pacific coast is that for the Pacific salmon, large quantities of which are preserved in tins for export to Europe. On the Atlantic side, also, the rivers of Maine and farther north abound in salmon.

*The Fishery Disputes.*—Fish, forming an article of great economic importance and value to all seaboard countries, it is self-evident that the rights of the citizens of such countries to the protection of the fishing industry would be jealously conserved by the respective governments. The United States, as a great maritime nation, is especially interested in this important subject, and the history of its negotiations with other countries in regard to the rights and privileges of fishermen is a long and interesting one. Owing to the fact that the waters to the north wash the shores of Canada, the principal difficulties have arisen with Great Britain, and the treaty negotiations have been had with that country, which still retains in its hands the treaty-making power even in matters directly affecting its great colony.

Prior to the Revolutionary War the American colonists enjoyed, as subjects of Great Britain, the same rights and privileges in regard to the fisheries off Newfoundland and the Maritime Provinces as did the people of those countries and British subjects generally. What trouble there then was grew out of the encroachments of the



French, which were resisted by all the colonists alike.

Under the Treaty of Paris, which closed the Revolutionary War, Great Britain accorded to the United States the same privileges of catching fish as had been previously held by the colonists. They were also granted the right of drying and curing their catch on the then unoccupied coast of Nova Scotia, Labrador, and the Magdalen Islands. But after a time difficulties arose. A number of refugee Tories, who claimed indemnity from the United States for property confiscated during the Revolutionary War, settled in Nova Scotia and asserted exclusive rights over the adjacent waters. The War of 1812-15 followed and Great Britain proclaimed the abrogation of the treaty rights. The Treaty of Ghent, made at the close of the war, settled the question in accordance with the British demands. Great Britain had formerly possessed, or at least had claimed, the right of free navigation of the Mississippi. Under the Louisiana purchase the entire Mississippi Valley had passed (1803) into the control of the United States, and it was felt that the navigation of that great artery of commerce should be vested in the United States. A proposition was made, however, to accord Great Britain her former right in exchange for a continuance of the old-time fishing privileges, but this was refused, and the Americans lost all their rights of inshore fishing, drying, and curing.

Difficulties arose over the seizure of American vessels by the British for violating the treaty, and in 1818 a convention was held at which a settlement was made. Under this convention the United States gave up the claim to the right of fishing and of curing and drying fish within the maritime boundaries, with the exception of the southern shore of Newfoundland, from the Rameau Islands westward to Cape Ray, and thence along the whole western and northern shore to Quirpon Island, on the opposite coast of Labrador from Mount Joly, northward through the straits of Belle Isle, and on all the shores of the continent and islands farther north, as well as on the shores of the Magdalen Islands. The United States obtained further the privilege of drying or curing fish on the coasts of Labrador and Newfoundland as long as those coasts were uninhabited; afterward they were to make agreements with the settlers or the proprietors of the grounds. It was stipulated in the treaty that these rights were to be permanent and not to be removed or abrogated in case of war. On the other hand, the United States were to give up the liberty of taking, curing or drying fish within three nautical miles of the other coasts, bays or harbors of the British dominions; they were, however, permitted to enter such bays or harbors for the purpose of shelter and of repairing damages therein, of purchasing wood and obtaining water. Originally the American commissioners had inserted bait among the supplies obtainable in the above-named places, but permitted it to be stricken out as being of little importance, as was indeed the case before the development of the mackerel fishing.

Even this arrangement did not settle the difficulties. The increasing value of the mackerel fishery, and the fact that those fish were to be found in greatest quantity within the territory named, led American fishermen to contend strenuously for their rights, while the colonial and British authorities not only held to a strict interpretation of the treaty made by the convention, but sprang a new point, which, if settled in their favor, would almost entirely block out the fishermen of the United States from the best fishing grounds. Their claim was that the three mile line should be drawn from headland to headland, instead of at a line following the trend of the coast and three miles distant from it. Under this claim Americans would have been entirely

excluded from the Bay of Fundy and the Bay of Chaleur. The Nova Scotian authorities also closed to Americans the herring fishery of the Magdalen Islands and sought to prevent them from navigating the Strait of Canso. In 1843 an American fishing schooner was seized in the Bay of Fundy. Great Britain agreed, on diplomatic representations being made, to admit Americans to the navigation of that bay, but subsequently, in deference to the protest of Nova Scotia, retracted the concession. In 1853 the matters in dispute were submitted to a joint commission, but this body failed to reach an agreement. Subsequently the headlands question was decided by an umpire, who ruled against the British, and determined that bays were not territorial waters when their headlands were more than ten marine miles apart. With the development of her natural resources, Canada became anxious to find an outlet for her products by establishing friendly commercial relations with the United States. To attain this end, she brought about what is known under the name of the Elgin reciprocity treaty. According to this, Canadian products were admitted free of duty into the United States, and the inshore fishing privileges were granted to Americans, as under the treaty of 1783. The provinces certainly lost nothing by the new treaty, for it helped to develop their resources in a way that led to a prosperity never experienced before. Things went thus well until the war of the rebellion, during which the relations between the government at Washington and the British government were disturbed in consequence of unfriendly acts of the British and Canadians. The treaty of 1854 expired by limitation in 1866, and the ill-feeling was so great that neither party felt disposed to renew it. The provincial authorities began to levy a tax, at first of fifty cents per ton, on American fishing-boats within their waters, and this was paid. But when the tax, or, as it was termed, the license-fee, was raised to two dollars per ton the fishermen refused to pay what they considered an exorbitant charge.

The formation in 1867 of the Dominion of Canada and the uniting of the seaboard provinces of Nova Scotia and New Brunswick to Canada, led to the placing of the fisheries under a Canadian cabinet minister. The new official, verifying the trivial proverb, took strong measures, not only to protect the Canadian fisheries, but to secure for the fishermen of the Dominion advantages over the Americans in the open-sea fisheries. The terms of the treaty of 1818 were again most illiberally interpreted, and the right of buying bait and other supplies in Canadian ports was called in question.

The right of landing fish and shipping them in bond over the railroads to the United States was denied; the practice, however, was not suppressed, nor were Americans excluded from the bay fisheries under the old doctrine that the lines drawn from headland to headland mark the shore. These two latter questions were left in abeyance till a satisfactory settlement of the whole difficulty should be reached. It is not to be denied that New England fishermen often invaded the territorial fishing-grounds, notwithstanding the proclamation of their own government. The Dominion spent \$1,000,000 for armed cruisers and attempted to police the entire sea. Finally a joint commission was appointed, which met at Washington in 1872 and agreed upon a basis of settlement to go into effect the following year. The United States protested against the abuse by the provincial authorities of their technical rights, especially their prohibition of the purchase of bait by American seamen, and offered \$1,000,000 in cash for the perpetual right to fish in inshore waters. This offer was declined by the British. The joint commission finally came to the agreement that the fisheries of Canada and the



United States, north of the thirty-ninth parallel, northern latitude, should be opened to the fishermen of both countries, and that the United States, besides admitting Canadian fish and fish-oil free of duty, should pay in money the value of the rights granted to American fishermen in Canadian waters, with the deduction of the value of the American fishery rights to Canada.

The amount was to be fixed by joint commissioners and an umpire. The former, consisting of Messrs. Galt and Kellogg, represented Canada and the United States, while the role of umpire was conferred upon M. de la Fosse, the Belgian minister at Washington.

The commission convened at Halifax in 1877. It was claimed by the Canadian counsel that the actual and prospective value of the mackerel fisheries to the United States was \$1,000,000 per year; the American side held that the commission ought but to calculate their value from the trade returns, and that the remission of \$350,000 of duties, collected annually on fish and oil, was a full equivalent for the Canadian fishery privileges. The commission rendered its decision on November 23, 1877, and well may it have surprised the Americans, for the amount to be paid was fixed at the enormous figure of \$3,500,000. Congress authorized the payment only under the proviso that the president should consider that the good faith of the nation demanded it.

Mr. Evarts, secretary of state, said before the British Government that the Canadian fisheries were worth to the United States not more than \$25,000 per year, and he backed his assertion by statistical evidence; still Lord Salisbury insisted that the decree of the commission was final, and the amount was paid. What kind of a bargain the United States made by the transaction may be judged from the fact that the remission of duties, for the twelve years of the duration of the treaty, amount to \$4,200,000. The treaty was to last for ten years and could then be terminated by either side on giving two years' notice. Its operation was attended with considerable friction, culminating in what became known as "the Fortune Bay outrage." In this case certain Americans, who were fishing on Sunday, were driven out of the bay by a mob of Newfoundlanders, the excuse being that the Sunday labor was an infraction of a local statute. The Marquis of Salisbury, then in power in England, claimed that the fishery rights were held subject to all local regulations, reasonable or otherwise. Lord Granville, the Liberal minister, who succeeded him, abandoned this preposterous claim, and conceded that unreasonable local laws could not be permitted to restrict the provisions of a treaty between two great nations. Damages were accordingly paid to the American fishermen; but the tension had become great, and in 1883 the United States gave notice to terminate the treaty, which accordingly expired on July 1, 1885. This was in the middle of the fishing season, but an agreement was made to prolong the action of the treaty for six months.

President Cleveland recommended to Congress the appointment of a joint commission with large powers, in fact with authority to consider the whole subject of the trade between the United States and the Dominion of Canada. The difficulties between the American fishermen and the Canadian authorities increased during this year. There is no doubt that the Americans fished within the Canadian jurisdiction, and no doubt that on the other hand the Canadians, after the expiry of the treaty of 1873, placed a most extreme and literal construction on the provisions of the convention of 1818, upon which they fell back. They absolutely forbade the purchase of bait or the landing and transshipment of fish. The United States granted trading-licenses to the fishing-vessels, but the Canadian customs authorities

refused them the rights secured to trading vessels under all treaties. During the season of 1886 over thirty American vessels were seized for alleged infractions of the custom-laws, or for buying bait, landing fish, or taking on crews. None of these seizures was made within the three-mile limit and loud complaints were made to the United States government by the despoiled fishermen, some of whom were fined and subjected to considerable loss, while several vessels were confiscated. The Canadian government claimed to decide all these cases under acts of the Dominion Parliament, while the United States held that decisions could only be made in properly constituted admiralty courts and according to international law. Much diplomatic correspondence followed. In the United States retaliatory measures were now suggested. During the congressional session of 1886 a bill was introduced in the House of Representatives to close American ports to Canadian vessels, and to forbid the entrance of Canadian fresh or salt fish or other products into the United States by railroad, should the Dominion authorities insist upon denying to American fishermen the rights granted to them under the treaty of 1818. The bill was supplanted by another, originating in the Senate, giving the President discretionary authority to forbid the vessels of the British dominions entrance into any or all the ports or waters of the United States, except in cases of distress, and to prohibit the entry of fish or other products from them into the United States. In December, 1886, the American minister in London presented to Lord Iddesleigh a proposal for an *ad interim* arrangement, by which a mixed commission was to be established in order to separate the exclusive from the common right of fishing on the coasts and in the adjacent waters of the British North American colonies. The headland question was to be considered as settled by the former decision of the British referee, mentioned above. American fishermen were to have the right of purchasing bait and other supplies, while British and American war vessels were to act as a police to prevent poaching on the inland fisheries. But the Canadian government declined to accept the proposals. On March 24, 1887, a counter proposition was presented by Lord Salisbury, according to which the American fishermen were to have the right of purchasing bait, obtaining crews and shipping fish by railroad, with the privilege of the inshore fisheries, while the Canadians were to import fish duty free into the United States. In the autumn of 1887 Mr. Joseph Chamberlain, an English member of parliament, came to this country empowered to confer with representatives of the United States, but his mission failed to effect any practical good. On February 15, 1888, a convention was concluded between the United States and Great Britain, and a treaty drawn up in accordance with its provisions was sent to the United States Senate by President Cleveland on February 20. This treaty was negotiated by Messrs. Bayard, Putnam, and Angell, for the United States; Mr. Chamberlain, Sir Sackville West, then British minister at Washington, and Sir Charles Tupper, of Canada, for Great Britain. It provided for a mixed commission, two members to be chosen by each side, with power to delimit the British waters of Canada and Newfoundland. This was fixed at three marine miles seaward from low water, except at bays, creeks, or harbors less than ten miles wide. The United States was to renounce all claim to take, dry or cure fish within these limits, and were to have free navigation in the Straits of Canso. Fishing vessels of both countries were to have ordinary rights of refitting and purchasing provisions and supplies in the ports of the other power. It was further provided that when the United States should remove the duties



from Canadian fish and fish oils the like products should be admitted free of duty into Canada and Newfoundland. The last provision was that after the removal of such duties, vessels of either country might purchase bait and provisions, transship their catch, or ship crews in the ports of the other. And in order to remove the existing friction a *modus vivendi* was provided to extend over two years or pending the ratification of the treaty within that time. Under this, American vessels, on payment of an annual license of \$1.50 per ton, were to be allowed to enter Canadian ports for the purposes named above.

The Senate debated the treaty at great length, and on August 21, 1888, refused, by a vote of twenty-seven yeas to thirty nays, to ratify it. President Cleveland thereupon asked for further powers to undertake retaliatory measures in case such should become necessary. A bill for this purpose was passed in the House of Representatives, but the Senate took no action upon it.

In December, 1888, Mr. Cleveland again called the attention of Congress to the necessity of settling the questions at issue. In the Dominion Parliament, on March 2, 1889, the Liberal leader offered a motion to continue the *modus vivendi*, which was opposed by the premier, Sir John Macdonald, and rejected by 108 votes to sixty-five.

*The Seal-Fishing Troubles.*—Although the capture of seals on the Alaska coast is effected by knocking the creatures down, and although the seal is no more a fish than a bird, yet the industry is popularly known as "seal-fishing," and the subject is so closely connected with fishing questions, especially of an international character, that it may properly be treated of in this place. After the acquirement of Russian America, in 1867, Congress placed Alaska under control of the treasury department, and passed stringent laws regulating the manner of capturing the seals. It was provided that no seals or other fur-bearing animals should be killed except by leave of the department, and penalties of fine and imprisonment and of forfeiture of vessels engaged in unlawfully taking them, were provided. Then a lease was made to the Alaska Commercial Company, of the Pribylov Islands, the principal breeding-grounds of the seals, for which the company paid an annual rental of \$60,000 and a royalty of \$2 on each seal-skin shipped. It covenanted also not to use any fire-arms in hunting seals, not to kill more than 100,000 head per annum, and to observe a certain specified "close time."

The lessees, however, were not permitted to conduct their business in peace. The Indians destroyed many seals, whose skins they traded for whisky. Scores of steamers and sailing-vessels from British Columbian ports poached on the seal-preserves, using fire-arms to kill the seals, and slaughtering them indiscriminately, without regard to age or sex. United States cruisers were sent to patrol the seas, for the seals were being rapidly exterminated.

Finally, in 1886, the United States made a claim that under the treaty by which it acquired the Russian possessions it inherited the right to an absolute control of Behring Sea—a claim formerly made by Russia. This proposition, that this vast body of water is a *mare clausum*, had been protested against by both the United States and Great Britain as far back as 1822, when Russia strove to enforce it. Russia specifically conveyed this right in the Alaskan treaty of 1867, but as to its power to do so, it is not our province to judge. However, the United States proceeded to enforce its sovereignty, and the treasury department instructed the revenue cutter *Corwin* to seize all sealers found to the east of a line drawn from between the Diomedé Islands,

in Behring Strait, in a southwesterly direction to a point equi-distant from Copper and Otter Islands in the Aleutian group. Consequently, in 1886, the British schooners *Caroline*, *Onward* and *Thornton*, were captured and taken to Sitka. In the outcoming trial the vessels were condemned, the masters fined, and the seal-skins on board confiscated and sent to San Francisco. Such proceedings stirred up great indignation in England. The British Government at once took up the case of its subjects, made a demand for the release of the prisoners, and claimed damages to the amount of about \$16,000 for loss of property, of time, and probable profits, as well as for illegal imprisonment. On January 26, 1887, by the direction of the president, Attorney-General Garland sent a dispatch to the authorities in Alaska ordering the unconditional release of the imprisoned seal hunters, and the surrender of the vessels and other property. The order was not executed, because, as was afterward found out through a letter of the United States marshal at Sitka reaching the attorney-general by October 12, it was thought that the dispatch was a forgery. Meanwhile the officials of the treasury department had not revoked their instructions, and the steamer *Rush*, sailing under the same orders, seized, in 1887, the British vessels *Dolphin*, *Annie Beck*, *W. P. Sawwood*, *Grace*, and *Alfred Adams*, besides seven American sealers. In 1888 Congress directed the president to enforce the laws in relation to Behring Sea, but the wording of the joint resolution did not convey the claim that the sea is *mare clausum*. Early in 1891 correspondence between Secretary Blaine and the Marquis of Salisbury on the subject was published; but the points at issue still remain unsettled.

FISHES, a great class of backboned animals, rising above the lowly vertebrates—Ascidians, lancelet, and round mouths—on the one hand, and leading on to the Amphibians on the other. The Tunicates or Ascidians are indeed numerous, but they are mostly degenerate; the level attained by the lancelet (*Amphioxus*,) is represented only by a single genus; the round mouths or Cyclostomata are few in number and particularly retrogressive, but the fishes have been and are successful. In the possession of the characteristic vertebrate axis and central nervous system, in general compactness and co-ordination of structure, in their external armature of scales, and in their great fecundity, fishes have an easy pre-eminence over their invertebrate inferiors, while as successfully adapted forms they hold as firm possession of their own special medium as birds do of theirs. Their success may be read in the immense number of individuals, species, and genera, not only now, but in the great æons of the past; in the geological record which shows how the Cartilaginous Fishes or shark tribe have persisted strongly from Silurian times, or how the decadent Ganoid (*e.g.* sturgeon) order is followed by a yet richer predominance of the modern Bony Fishes; and, furthermore, in the wealth of adaptive specialisation which distinguishes so many, and which in the case of the 'double-breathers' or Dipnoi prophesies, in the evolution of lungs, the important transition from water to *terra firma*.

Like other vertebrates, fishes possess a segmented body, well indicated by the disposition of the muscles; a dorsal nerve cord, swollen anteriorly into a brain; a dorsal axis or notochord, more or less completely replaced by a genuine backbone; a set of respiratory clefts on the pharynx, which here persist and are associated with gills; a ventral heart; and eyes which arise for the most part as outgrowths of the brain. But their prominent peculiarities are associated with the three sets of structures—scales, fins, and gills. The scales are both products of outer and inner skin—*i.e.* of both epidermis



and dermis; the unpaired median fins are always supported by skeletal rays, and the paired lateral fins or limbs are never in any definite sense fingered; the gills are retained throughout life, and except in the Dipnoi there are only the beginnings of pulmonary respiration. Technical negative characters are the absence of an allantoic bladder and of a true inferior vena cava.

*Structure and Functions.*—The most characteristic form is that of herring, haddock, salmon, and the like, an elongated, laterally-compressed spindle, thinning off like a wedge posteriorly, and obviously the result of, or an adaption to, the mode of aquatic progression. But the skates are flattened from above downwards, and the bony flat-fish, such as plaice, are compressed laterally; the eels, the ribbon-fish (*e. g.* Regalecus), the band-fish (Cepola), the pipe-fish (Syngnathus), are much elongated: while the globe-fish (Tetrodon, Diodon), coffer-fish (Ostracion), and sun-fish (Orthogoriscus) are more or less globular. The flat-fish live at the bottom; the elongated forms have a serpentine habit of creeping through crevices; the globular forms are sluggish, and may float apparently passive in the water. Prominent external characters are the nostrils and eyes, the openings of the gill-cavities, the various kinds of scales, the paired and the median fins, the lateral sensory lines, the openings of the gut and urinogenital organs, the symmetrical or asymmetrical shape of the tail.

The skin has no true glands; the under stratum or cutis is without muscular elements; both layers take part in forming the exoskeleton of scales. In some bony fishes, in the Dipnoi, and in the sturgeon, goblet-like mucous cells burst and produce a slimy surface, but the usual slime so noticeable in skates and many other fishes exudes from special sensory tubes. Pigment cells under nervous control are common in the skin—*e. g.* in plaice, which thereby more or less rapidly alter their color to suit their surroundings. The colors of fishes are often resplendent, and usually depend on the presence of lipochrome or fatty pigments, greatly enhanced by structural peculiarities and by the presence of a silvery foreground of guanin in the epidermic bells. As in the 'gemmeous dragonet,' the males are at the breeding season often transfigured in brilliant 'wedding' robes. The exoskeleton varies very widely, and so inconstantly that Agassiz' attempt to base a classification on the nature of the scales has been universally abandoned. Cartilaginous fishes are characterized by large or small skin-teeth, 'dermal denticles' or 'placoid scales' forming the spines of a thornback or the shagreen of a shark. They are based in bone, cored with dentine, tipped with enamel, and are similar in structure and development to the true teeth of the mouth. The bone and dentine are formed from the cutis or dermis, the enamel from the epidermis. Skin teeth occur here and there in other fishes, but flat scales predominate. Most fishes are oviparous, and all are extremely productive. The eggs are extruded on the bottom among gravel, and in many cases are discharged broadcast in the water. A few fishes, such as sturgeon and salmon, ascend rivers for spawning purposes; others, such as the eel, descend to the sea. See also ICHTHYOLOGY and PISCICULTURE.

FISHING-FROG, also Frog-fish or Sea-devil, a fish well known off the coast of Great Britain and Europe generally, the grotesque shape of its body and its singular habits having attracted the attention of naturalists of all ages.

FISTULA, a term in surgery used to designate an abnormal communication leading either (1) from the surface of the body to a normal cavity or canal, or (2) from one normal cavity or canal to another. These communications are the result of disease or injury.

They receive different names according to their situation:—*lachrymal fistula*, in connection with the lachrymal apparatus; *salivary fistula*, in connection with the salivary duct in the cheek; *anal fistula*, in connection with the anus; *urethral fistula*, in connection with the urethra—are all examples of the variety of the first kind of fistula; while *recto-vesical fistula*, a communication between the rectum and bladder, and *vesico-vaginal fistula*, a communication between the bladder and vagina, are examples of the second. The abnormal canal may be straight or tortuous, of considerable diameter or of narrow caliber. The fistulous channel will remain patent as long as the contents of the cavity or canal with which it is connected pass along it in whole or in part. There is always a natural tendency to contraction. The treatment is founded on these principles:—remove the obstruction, encourage the flow along the natural channel; for example, open up the nasal duct, allow the tears to reach the nasal cavity, and the *lachrymal fistula* will close; so also in the *salivary* and *urethral* varieties. Sometimes it may be necessary to lay the channel freely open, and allow it to close from its deeper parts to the surface, as in *anal fistula*; in other cases it may be necessary to pare the edges of the abnormal opening and stitch them together, hoping for union of the edges.

FITCH, JOHN, one of the first inventors in connection with steam navigation, was born at Windsor, Conn., January 21, 1743. He was the son of a farmer, and received the usual common school education. At the age of seventeen he went to sea, but he discontinued his sailor life after a few voyages, and became successively a clock maker, a brassfounder, and a silversmith. During the rebellion he followed the trade of sutler to the American troops, and amassed in that way a considerable sum of money, with which he bought land in Virginia. He was appointed deputy-surveyor for Kentucky in 1780, and when returning to Philadelphia in the following year he was captured by the Indians, but shortly afterward regained his liberty. About this time he began an exploration of the northwestern regions, with the view of preparing a map of the district; and while sailing on the great western rivers, the idea occurred to him that they might be navigated by steam. In 1786 he was successful in forming a company for experimenting in steam navigation. A steamboat built by Fitch conveyed passengers on the Delaware in 1790, but the undertaking was a losing one, and led to the dissolution of the company. In 1793 he endeavored to introduce his invention into France, but met with no success. On his return to America he found his property overrun by squatters, and, reaping from his invention nothing but disappointment and poverty, he committed suicide in 1798. He left behind him a record of his adventures and misfortunes, "inscribed to his children and future posterity;" and from this a biography was compiled by Thompson Westcott (Philadelphia, 1857).

FITCH, RALPH, a London merchant and one of the earliest English travellers in India, lived in the latter half of the 16th century. With four companions he traveled in various portions of continental and insular Asia. Fitch ultimately left his companions, and after reaching Bengal he sailed in 1589 for Cochin, touching on his way at Ceylon. After sojourning at Cochin eight months he re-embarked for Goa, and thence retraced his footsteps to Tripoli, finally reaching London on the 29th of April, 1591.

FITCHBURG, a city in Worcester county, Massachusetts, is situated on the Nashua river, fifty miles west-northwest of Boston, at the junction of three railroads. It is a city of 22,037 population, and has extensive



manufactures of chairs, engines, boilers, machinery, cotton and woolen goods, paper, shoes, and watches. One daily paper is published, and the city contains four national banks and two savings banks.

FITZGERALD, LORD EDWARD, one of the leaders of the Society of the United Irishmen, was a younger son of the first duke of Leinster, and was born at Carton Castle, near Dublin, October 15, 1763. Lord Edward was carefully educated by his stepfather, Mr. Ogilvie, chiefly with a view to the profession of a soldier. Returning to England in 1779 he entered the English army, and in 1781 he sailed with his regiment for America, where he soon obtained the appointment of aide-de-camp on the staff of Lord Rawdon. He served in the war with no little reputation for personal courage, readiness of resource, and humane feeling. He was severely wounded at the battle of Eutaw Springs. After the surrender of Yorktown he joined the staff of General O'Hara at St. Lucia, and the same year (1783) returned to Ireland. He was soon returned as member for Athy to the Irish parliament; but the high hopes which he had cherished of serving his country faded away at the spectacle of political corruption and suppression of all genuine representation by the penal laws against Roman Catholics. In 1787 he set out for a visit to the south of Europe, went afterward to America, and in 1790 returned to England, and soon resumed his seat in the Irish parliament. The French Revolution had broken out, and Lord Edward was one of those ardent spirits that welcomed with enthusiasm the promise of its first days. In 1792 he was attracted to Paris, and made the acquaintance of the most famous leaders of the Revolution. Having publicly renounced his title of nobility and avowed his sympathy with the republicans, he was dismissed, with other officers, from the English army. It was during this visit to Paris that he was introduced to the lady then known as "Pamela," the daughter of Madame de Genlis, by the duke of Orleans ("Égalité"). In December, 1792, they were married at Tournay, and returned to Ireland in January, 1793. After a period of singular happiness spent in a country home, his sympathies with the struggles of his countrymen led him out to the troubled arena of politics. He joined in 1796 the society of United Irishmen, was sent to France to negotiate a treaty with the Directory for a French invasion of Ireland, and urged on with the utmost zeal the preparations for an Irish insurrection. But the scheme was betrayed, several of the leaders were arrested, and Fitzgerald concealed himself in a house at Dublin, still continuing to direct the movement. A price was set on his head, the place of his retreat was discovered, and after a severe struggle he was captured by police officers (May 19, 1798) and committed to prison. There he died on June 4th, of the wounds which he had received; a bill of attainder was immediately passed against him, and his estates were confiscated; but the attainder was at a later time reversed. His widow married Mr. Pitcairn, American consul at Hamburg; but the union was an unhappy one, and ended in a separation by mutual consent. Lady Fitzgerald henceforward lived in retirement at Montauban till 1830, when she removed to Paris, Louis Philippe, the associate of her childhood, having become king of the French. He, however, refused to see her, and she died poor in 1831.

FITZGERALD, LORD THOMAS (d. 1536), was vice-deputy of Ireland for his father, Gerald, ninth earl of Kildare, in the reign of Henry VIII. He appears to have accompanied his father to London early in 1534, on occasion of the third summons of the earl to answer grave charges of maladministration as lord deputy. But after the earl's committal to the Tower he was sent back to Ireland to take the place of vice-deputy in his

father's absence, with secret instructions to raise a rebellion against the English Government. He was at this time hardly of age, and his amiable manners and accomplishments had procured for him the appellation of "Silken Thomas." He was, however, of a high spirit and fiery temper, and fiercely resented the English rule. As soon as he arrived in Ireland, he cleared the way by formally surrendering his office and the sword of state, and then openly proclaimed a rebellion. He obtained possession of Dublin city before the end of July, and formed the siege of the castle, into which the English governor had withdrawn. Archbishop Allen, the primate who had been appointed by Henry VIII. to keep watch over Kildare and to report his proceedings, sought safety in flight and sailed for England. But the ship was run aground, and the archbishop was seized by the young Lord Thomas and massacred in his presence with his English chaplains and attendants. This murder was reported by a special messenger from Fitzgerald to the pope and the emperor, the former being asked for absolution if necessary, and the latter for assistance. Sentence of excommunication was pronounced on Fitzgerald for the murder of the archbishop. In August Fitzgerald was forced to relinquish the siege of Dublin Castle, and hasten to defend or recover his own domains which the earl of Ormond had invaded. He tried in vain to seduce Ormond from his allegiance, but obtained a truce, of which he took treacherous advantage to attack him. He then again besieged Dublin, which had closed its gates against him. On October 14th, in consequence of Ormond's renewed invasion of Kildare, he was compelled to raise the siege. Three days later the English army landed in Dublin, and was enthusiastically welcomed. Fitzgerald withdrew into the country; but taking advantage of the inactivity of Skeffington, the new deputy, he approached Dublin again and burnt two villages near the city (November). The old earl had been attainted, and he died in the Tower soon after hearing of his son's rebellion and excommunication. The deathblow to the rebellion was at length given by Skeffington, who in March, 1535, stormed the castle of Maynooth, the chief stronghold of the "Geraldines." Lord Thomas, who had now succeeded his father, but did not assume the title, retreated into Thomond, intending to sail for Spain and plead with the emperor. This scheme he relinquished, and after leading a wandering life for some months, with a price set upon his head, he surrendered without definite conditions to Lord Leonard Grey (August), and was at once conducted by him to England. He was committed to the Tower with his five uncles; and the six Geraldines were hung at Tyburn as traitors (February 3, 1536). An act of attainder was passed against the earl of Kildare, Lord Thomas, and others, in 1537; but the family estates were restored by Edward VI., and the attainder was repealed by Queen Elizabeth.

FITZHERBERT, SIR ANTHONY, an eminent English lawyer, was born at Norbury. After studying at Oxford, he was called to the English bar, and in 1523 became justice of the court of common pleas, the duties of which office he continued to discharge till within a short time of his death in 1538. As a judge he left behind him a high reputation for fairness and integrity, and his legal learning is sufficiently attested by his published works.

FITZROY, ROBERT, a vice-admiral in the English navy distinguished as a hydrographer and meteorologist, was born at Ampton Hall, Suffolk, July 5, 1805, being a grandson, on the father's side, of the third duke of Grafton, and on the mother's, of the first marquis of Londonderry. He entered the navy from the Royal Naval College, then a school for cadets, on October



19, 1819, and on September 7, 1824, was promoted to the rank of lieutenant. After serving in the *Thetis* frigate in the Mediterranean and on the coast of South America, under the command of Sir John Phillimore and Captain Bingham, he was in August, 1828, appointed to the *Ganges* as flag-lieutenant to Rear-Admiral Sir Robert Otway, the commander-in-chief on the South American station; and on the melancholy death of Commander Stokes of the *Beagle*, November 13, 1828, was promoted to the vacant command. The *Beagle*, a small brig of about 240 tons, was then, and had been for the two previous years, employed on the survey of the coasts of Patagonia and Tierra del Fuego, under the orders of Commander King in the *Adventure*, and, together with the *Adventure*, returned to England in the autumn of 1830.

Early in 1843, Fitzroy was appointed governor and commander-in-chief of New Zealand, then recently established as a colony. He arrived in his government in December, while the excitement about the Wairau massacre was still fresh, and the questions relating to the purchase of land from the natives were in a very unsatisfactory state. The early settlers were greedy and unscrupulous; Fitzroy, on the other hand, had made no secret of his partiality for the aborigines. Between such discordant elements agreement was impossible; the settlers insulted the governor; the governor did not conciliate the settlers, who denounced his policy as adverse to their interests, as unjust and illegal; colonial feeling against him ran very high; petition after petition for his recall was sent home, and the government was compelled to yield to the pressure brought to bear on it. Fitzroy was relieved by Sir George Grey, in November, 1845.

In September, 1848, he was appointed acting superintendent of the dockyard at Woolwich, and in the following March, to the command of the *Arrogant*, one of the early screw frigates which had been fitted out under his supervision, and with which it was desired to carry out a series of experiments and trials. When these were finished, he applied to be superseded, on account at once of his health and of his private affairs. In February, 1850, he was accordingly placed on half-pay; nor did he ever serve again, although advanced in due course by seniority to the ranks of rear and vice-admiral on the retired list (1857, 1863). In 1851, he was elected a fellow of the Royal Society, and in 1854, after serving a few months as private secretary to his uncle, Lord Hardinge, the commander-in-chief of the army, he was appointed to the meteorological department of the Board of Trade, with, in the first instance, the peculiar title of "Meteorological Statist."

His last years were fully and to an excessive degree occupied by it; his health, both bodily and mental, threatened to give way; but he refused to take the rest that was prescribed. In a fit of mental aberration he put an end to his existence on April 30, 1865.

FITZSTEPHEN, WILLIAM, an English historian, was a native of London, and died in 1191. Becoming a monk of Canterbury, he had very confidential relations with Thomas à Becket. Shortly after the death of Thomas he wrote his life in Latin, a work which bears internal evidence of greater impartiality and truthfulness than most of the archbishop's biographies, and is besides of interest as containing a long description of the city of London.

FIUME, a royal free town and port of Hungary situated at the northern extremity of the Gulf of Quarnero, on the Recina (Fiumara), forty-six miles by road southeast of Trieste.

FIVE FORKS, a county cross-roads in Amelia county, Va., notable as the scene of a bloody battle

between the Union forces under Gen. U. S. Grant, and the Confederates, under Gen. R. E. Lee, fought in March, 1865. It resulted in the evacuation of Richmond by the Confederates, the raising of the siege of Petersburg, and finally in Lee's surrender at Appomattox, one month later.

FIVES is a game which has existed in various forms from the earliest times. The name is derived from the essential feature of the pastime consisting in striking a ball with the five digits of the human hand, the idea of their sometimes having been five players on each side requiring confirmation. In the "open" court the only desiderata are a level piece of ground and a smooth wall in front, against which the ball is struck. A "close" court has in addition two side-walls at right angles to the front one, and the whole may or may not be covered in. The invariable principle is to strike the ball, not later than at its first rebound from the ground, against the front wall and above a certain line as many consecutive times as possible. A single game comprises one player a side, a double one two. The minor rules vary at most schools and universities, and are generally handed down by tradition. About two inches is the usual diameter of the ball, the core being made of india rubber, bound round with fine twine, and covered with white leather.

FIVES, a town in France, department of the Nord, now administratively connected with Lille. See LILLE.

FIX, THEODORE, a French journalist and political economist, was born at Soleure, in Switzerland, in 1800. His father was a French physician, who had been expatriated for a civil offense. Young Fix adopted at first the profession of a land surveyor, but, tiring of the monotony of this employment, he, in 1830, became connected with the *Bulletin Universel des Sciences*, to which he contributed most of the geographical articles. In 1833 he founded the *Revue mensuelle d'Économie Politique*, which he continued until 1836. His principal work is *Observations sur les Classes Ouvrières*, 1846, in which he argues against all attempts to regulate artificially the rate of wages. He died suddenly at Paris, July 31, 1846.

FIXTURES, in law, may be defined as things which have been fixed or attached to land, or, as it is expressed in English law, things annexed to the freehold. All systems of law make a marked distinction between immovables and movables, between real and personal property, between land and all other things. In the case of fixtures the question arises under which set of rights they are to fall—under those of real or of personal property. The general rule of English law is, that everything attached to the land goes with the land—*quidquid plantatur solo, solo cedit*. This, like many other rules of English law, is all in favor of the freeholder, and its injustice has been modified by a large number of exceptions, formulated from time to time by the courts as occasion arose.

FLACCUS, CAIUS VALERIUS, a Roman poet of the first century of the empire, of whose personal history little or nothing is known. He has been identified, but on wholly insufficient grounds, with the Flaccus, a poet friend of Martial, to whom the 77th epigram of the 1st book is addressed, and hence described as a native of Padua, and in needy circumstances. In the subscription of the Vatican MS., the names *Setinus Balbus* are appended, whence it is probable that he was born at Setia in Campania. The sole notice of him found in classical authors is a short sentence of Quintilian (*Inst.*, x. 1, 90), "Multum in Valerio Flacco nuper amisimus," whence we gather that he must have died before 90 A.D., though it does not follow, as is commonly stated, that he was cut off by an untimely death.



FLACIUS (in German VLACICH), MATTHIAS, sur-named Illyricus, a celebrated German theologian of the time of the Reformation, was born at Albona in Illyria in 1520. Having lost his father in early childhood, he owed his education almost wholly to his own unaided perseverance. At the age of seventeen he had resolved to enter a convent in order to devote his life to sacred learning; but on the advice of one of his relations, who had imbibed Reformation principles, he abandoned his intention, and pursued his studies successively at Basel, Tübingen and Wittenberg. At Wittenberg he fell for a time into religious despondency, and sought the advice of Martin Luther, who was successful not only in removing his doubts, but in inspiring him with much of his own Reformation zeal. In 1544 he became professor of Old Testament literature at Wittenberg, and soon began to take an active and prominent part in the theological discussions of the time. He strenuously opposed the Augsburg Interim, and also the compromise of Melancthon, known as the Leipsic Interim, and was compelled on that account to resign his professorship. From Wittenberg he proceeded to Magdeburg, and in 1557 he was appointed professor of theology at Jena, but soon became involved in a controversy with his colleague Strigel on the power of the human will in conversion. Being a strong upholder of the doctrine of man's natural inability, he was induced by controversial straits to fall unwittingly into the Manichæan heresy of affirming that original sin was not an accident in human nature, but now belonged to its substance; and as he would not submit to ecclesiastical censure, he was compelled in 1562 to resign his office. After staying for five years in retirement at Ratisbon, he accepted the charge of a congregation in Antwerp, but was soon compelled by religious persecution to leave that city for Strasburg. Here his views regarding original sin again exposed him to ecclesiastical censure, and he went to Frankfort-on-the-Maine, in the hospital of which city he died in 1575, having spent the latter years of his life in great poverty.

FLACOURT, ÉTIENNE DE, a French governor of Madagascar, was born at Orleans in 1607. When he was named governor of Madagascar by the East India Company in 1648, the French troops had mutinied against the former governor, and a large number of them had also been massacred by the natives. Flacourt soon restored order among the soldiers, but in his dealings with the natives he was less successful, and their intrigues and attacks kept him in continual harassment during all his term of office. As he was in uncertainty regarding the affairs of the company, he returned, in 1655, to France. Not long after he was appointed director general of the company; but, having again returned to Madagascar, he was drowned on his voyage home, June 10, 1660.

FLAG. It is probable that almost as soon as men began to collect together for common purposes some kind of conspicuous object was used, as the symbol of the common sentiment, as the rallying point of the common force. In military expeditions where any degree of organization and discipline prevailed, objects of such a kind would be necessary to mark out the lines and stations of encampment, and to keep in order the different bands when marching or in battle. And, in addition to all this, it cannot be doubted that flags or their equivalents have often served, by reminding men of past resolves, past deeds, past heroes, to rally to enthusiasm those sentiments of *esprit de corps*, of family pride and honor, of personal devotion, patriotism, or religion, upon which, as well as upon good leadership, discipline and numerical force, success in warfare depends.

Among the remains of that people which has left the earliest traces of civilization, the records of the forms of objects used as ensigns are frequently to be found. From their carvings and paintings, supplemented by ancient writers, it appears that the several companies of the Egyptian army had their own particular standards. These were formed of such objects as there is reason to believe were associated in the minds of the men with feelings of awe and devotion. Sacred animals, boats, emblems, or figures, a tablet bearing a king's name, fan and feather-shaped symbols, were raised on the end of a staff as standards, and the office of bearing them was looked upon as one of peculiar privilege and honor. Somewhat similar seem to have been the customs of the Assyrians and Jews. Among the sculptures unearched by Layard and others at Nineveh, only two different designs have been noticed for standards; one is of a figure drawing a bow and standing on a running bull, the other of two bulls running in opposite directions. These, says Layard, Mr. Birch supposes may resemble the emblems of war and peace which were attached to the yoke of Darius' chariot. They are borne upon and attached to chariots, which method of bearing these objects was the custom also of the Persians, and prevailed during the Middle Ages. No representations of Egyptian or Assyrian naval standards have been found, but the sails of ships were embroidered and ornamented with devices, which was also a custom during the Middle Ages. In both Egyptian and Assyrian examples, the staff bearing the emblem is frequently ornamented immediately below with flag-like streamers. Rabbinical writers have assigned the different devices of the different Jewish tribes, but the authenticity of their testimony is extremely doubtful. Banners, standards, and ensigns are frequently mentioned in the Bible.

The Persians bore an eagle fixed to the head of a lance, and also represented the sun, as their divinity, upon their standards, which appear to have been formed of some kind of textile, and were guarded with the greatest jealousy by the bravest men of the army. The Carian soldier who slew Cyrus, the brother of Artaxerxes, was allowed the honor of carrying a golden cock at the head of the army, it being the custom of the Carians to wear that bird as a crest on their helmets. The North American Indians carried poles fledged with feathers from the wings of eagles, and similar customs seem to have prevailed among other semi-savage peoples.

The Greeks bore a piece of armor on a spear in early times; afterward the several cities bore sacred emblems or letters chosen for their particular associations—the Athenians the olive and the owl, the Corinthians a pegasus, the Thebans a sphinx, in memory of Œdipus, the Messinians their initial M, and the Lacedæmonians A. A purple dress was placed on the end of a spear as the signal to advance. The Dacians carried a standard representing a contorted serpent, while the dragon was the military sign of many peoples—of the Chinese, Dacians, and Parthians among others—and was probably first used by the Romans as the ensign of barbarian auxiliaries.

The question of the *signa militaria* of the Romans is a wide and very important one, having direct bearing on the history of heraldry, and on the origin of national, family, and personal devices. With them the custom was reduced to system. "Each centuria, or at least each manipule," says Meyrick, "had its proper standard and standard-bearers." In the early days of the republic a handful of hay was borne on a pole, whence probably came the name *manipulus*. The forms of standards in later times were very various; sometimes a cross-piece of wood was placed at the end of a spear and



surmounted by the figure of a hand in silver, below round or oval discs, with figures of Mars or Minerva, or in later times portraits of emperors or eminent generals. Figures of animals, as the wolf, horse, bear and others, were borne, and it was not until after the time of Marius that the eagle became the standard of the legion; the *vexillum* was a square piece of cloth fastened to a piece of wood fixed crosswise to the end of a spear, somewhat resembling the mediæval *gonfalon*. The *labarum* of later emperors was similar in shape and fixing, and after Constantine bore the monogram of Christ. The Roman standards were guarded with religious veneration in the temples at Rome; and the reverence of this people for their ensigns was in proportion to their superiority to other nations in all that tends to success in war. It was not unusual for a general to order a standard to be cast into the ranks of the enemy, to add zeal to the onset of his soldiers by exciting them to recover what to them was perhaps the most sacred thing the earth possessed. The Roman soldier swore by his ensign.

Although in earlier times drapery was occasionally used for standards, and was often appended as ornament to those of other material, it was probably not until the Middle Ages that it became the special material of military and other ensigns; and perhaps not until the practice of heraldry had attained to definite nomenclature and laws does anything appear which is, in the modern sense, a flag.

The Bayeux tapestry, commemorating the Norman conquest of England, contains abundant representations of the flags of the period borne upon the lances of the knights of William's army. They appear small in size, and pointed, frequently indented into three points, and bearing pales, crosses and roundels. One, a Saxon pennon, is triangular, and roundly indented into four points; one banner is of segmental shape and rayed, and bears the figure of a bird which has been supposed to represent the raven of the war flag of the Scandinavian vikings. These flags and their charges are probably not really significant of the people bearing them; for, even admitting that personal devices were used at the time, the figures may have been placed without studied intention, and so give the general figure only of such flags as happened to have come under the observation of the artists. The figures are probably rather ornamental and symbolic than strictly heraldic — that is, personal devices, for the same insignia do not appear on the shields of the several bearers. The dragon standard which he is known to have borne is placed near Harold; but similar figures appear on the shields of Norman warriors, which fact has induced a writer in the *Journal* of the Archaeological Association to suppose that, on the spears of the Saxons, they represent only trophies torn from the shields of the Normans, and that they are not ensigns at all. Standards in form much resembling these dragons appear on the arch of Titus and the Trajan column as the standards of barbarians.

The present royal standard of England was hoisted on the Tower, January 1, 1801, and is thus described: Quarterly: first and fourth, gules, three lions passant guardant, in pale, or, for England; second, or, a lion rampant, gules, within a double tressure, flory counter flory of the last, for Scotland; third, azure, a harp or, stringed argent, for Ireland.

The flags of the United States of America were very various before and after the Declaration of Independence; and even after the introduction of the stars and stripes, these underwent many changes in the manner of their arrangement before taking the position at present established. The United States flag, as finally adopted, consisted of silver stars in a blue field — one star for each

State of the Union — and red horizontal stripes on a white ground. The number of stars has increased from thirteen to forty-four, and the number of red and white stripes is thirteen — the number of the original States. Historical events have also caused great changes in the standards and national ensigns of France. The ancient kings bore the blue hood of St. Martin upon their standards, and this was succeeded by the oriflamme, which, originally, was simply the banner of the abbey of St. Denis. At what precise period it became the sacred banner of all France is not known, and even its appearance is very differently described in different writers.

The oriflamme was succeeded in the fifteenth century by the white standard powdered with *fleurs-de-lis*, which itself gave place to the standard of the empire, and is the "cornette blanche" for which Chambord contended. The imperial standard was blue, bearing a golden eagle, and powdered with golden bees. The tricolor was introduced at the time of the Revolution, and is divided vertically into three parts, colored blue, white and red — the red to the fly, and the white in the middle. The origin of this flag and its colors is a disputed question. It is said by some to have been intended to combine the colors of the St. Martin's banner, of the oriflamme, and of the white flag of the Bourbons; by others the colors are said to be those of the city of Paris; and other authorities assert that the flag is copied from the shield of the Orleans family, as it appeared after Philip Égalité had knocked off the *fleurs-de-lis*.

FLAG or FLOWER-DE-LUCE, botanically *Iris*, the popular name of a genus of perennial plants of the natural order *Iridaceæ*, occurring in north temperate regions. *Iris Pseudacorus*, the Yellow Flag or Iris, is common on river banks, and in marshes and ditches. Its flowers appear in June and July, and are of a golden-yellow color. The leaves are from two to four feet long, and half an inch to an inch broad. Toward the latter part of the year they are eaten by cattle. The seeds are numerous and pale-brown; they have been recommended when roasted as a substitute for coffee, of which, however, they have not the properties. The astringent rhizome has diuretic, purgative and emetic properties, and may, it is said, be used for dyeing black, and in the place of galls for ink-making.

The rhizomes or underground stems of three species constitute the "orrisroot," or *rhizoma Iridis* of pharmacy, formerly known as "ireos" or "orice," which is exported in considerable quantity from southern Europe, more especially from the neighborhood of Leghorn and Trieste. Orris-root occurs in commerce in whitish, knobby, sometimes branched pieces, of about the thickness of the thumb, and having on one side numerous pits where the rootlets were attached. It has a bitterish and acrid taste, and is purgative and emetic in properties. By drying, it acquires the odor of violets. It is exported to India, where it is called *behh-bunufsha* (violet-root). By the ancients it was valued both for its odor and its healing virtues; and in England it was in past times in repute as a medicine for various complaints. Gerard states that "the root of the common Flower-de-luce, cleane washed, and stamped with a few drops of Rose water, and laid plaster-wise upon the face of man or woman, doth in two dayes at the most take away the blacknesse or blewnesse of any stroke or bruse;" he further advocates the use of the same remedy in dropsy and infirmities of the chest. It is now employed in the preparation of violet-powder, and of scented hair and tooth-powders and oils, as a perfume for the breath, for making issue-peas, and occasionally as an errhine. At the risk of causing irritation of the mouth and disturbance of the bowels, it is sometimes given to teething infants to bite. In America the



rhizome of *I. versicolor*, the blue flag, as also that of *I. Florentina*, is employed as a purgative and alterative in strumous complaints.

**FLAGELLANTS.** The practice of some form of flagellation as a religious observance is of very early origin, and has been more or less followed by nearly every nation, both savage and civilized. Special whipping ceremonies have also had a wide prevalence.

**FLAGEOLET.** See **FLUTE**.

**FLAHAUT DE LA BILLARDERIE, AUGUSTE CHARLES JOSEPH, COMTE DE**, a French general and diplomatist, was born in Paris on April 21, 1785. His father, a field marshal in the royal army, succeeded Buffon as intendant of the royal gardens, and was guillotined at Arras in 1793. His mother, an ingenious and elegant novel-writer, known as Madame de Souza, from the name of her second husband, the Portuguese author J. M. de Souza-Botelho, emigrated with him to England, and, after he had spent some time in Germany for the sake of his education, brought him back to Paris in 1798. The following year, young Flahaut, being only fifteen years of age, enlisted in a troop of volunteer cavalry, who were to accompany General Bonaparte, then first consul, to Italy. He had a brilliant career, being successively aide-de-camp to Murat, Berthier and Napoleon. In 1813 he was first gazetted general of brigade, and then general of division, and, although already a count by birth, received a second time this title from the great soldier of fortune who sought by his simple fiat to create a new empire to be propped up by a new nobility. He was a peer of France during the Hundred Days, and supported with all his influence the project of making Marie-Louise regent, and of thus securing the imperial throne for the young king of Rome under the title of Napoleon II. On the second return of the Bourbons he left France, and lived in exile from 1815 to 1830. In England, his usual place of retreat, he married (July 28, 1817) the daughter of Admiral Keith, who became an Irish peeress as Baroness Keith in 1823, and succeeded to the Scottish barony of Nairn in 1838. By her he had no son, but several daughters, the oldest of whom married the fourth marquis of Lansdowne. After the revolution of July, 1830, he returned to France, was restored to his former rank in the army, and was made a peer by the Government of Louis Philippe. He soon became a favorite with the duke of Orleans, the king's eldest son, who gave him a situation of trust in his household. He also received at the same time the dignity of the grand cross of the Legion of Honor, of which he had been a commander since 1814. His services as a diplomatist were made use of more than once; he was ambassador at Berlin in 1831, and at Vienna from 1842 until the revolution of 1848. When Louis Bonaparte became Napoleon III., Flahaut de la Billarderie, whose mother had brought up the duke of Morny, did not consider his fidelity as any longer pledged to the Orleans family, and was appointed senator (December 31, 1852). Nor was this the only imperial favor he could boast of. From 1860 until 1862 he was ambassador to London, and, on January 28, 1864, he was promoted to the high dignity of grand chancellor of the Legion of Honor. After that time Flahaut did not play any considerable part in the management of public business. He died on September 1, 1870.

**FLAMBARD, RANULPH (RALPH)**, (d. 1128), bishop of Durham, and justiciar under William Rufus, was a Norman of low birth, who came to England in the train of William the Conqueror in 1066. He took holy orders, obtained several church preferments, and was appointed chaplain to the bishop of London, and made prebendary of St. Paul's. He demanded the deanery

also, and this being refused him, he left the bishop's service. He afterward passed into the service of the king, William II., who made him his chaplain. Ambitious, greedy, and unscrupulous, he flattered and ministered to the vices of his master, and thereby raised himself to the highest places in church and state. On the death of William II., the bishop, to satisfy the outcries of the people, was sent to the Tower, "the first man," says Mr. Freeman, "recorded to have dwelled as a prisoner in the Conqueror's fortress." He fared sumptuously in his confinement, treated his keepers, and at length in February, 1101, managed to escape from the Tower, and fled to Normandy. There he joined Duke Robert, instigated him to the invasion of England, and returned to England with him. He was ultimately restored to his see, and appears to have occupied himself thenceforward with his duties, and in various architectural works—the completion of his cathedral, the building of Norham Castle, and the fortification of Durham. He endowed the college of Christchurch and founded the priory of Mottisford. Flambard died September 5, 1128.

**FLAME.**—An ordinary flame consists of a gas or vapor burning in contact with the air, and in most cases emitting light of greater or less intensity. It is thus distinguishable from the mere incandescence or glow produced by a burning body which does not become gaseous previous to combustion. Many solid substances, however, burn with flame, because under the influence of heat they either, as wood and coal, evolve combustible gases and vapors, or, as zinc, sulphur and phosphorus, become volatile. Charcoal, although a solid, when brightly heated in a furnace, yields flame, since carbon dioxide, or carbonic acid gas, in passing through it, furnishes the combustible gas carbon monoxide, or carbonic oxide. When the air or other supporter of combustion is intimately mixed with the combustible gas, ignition occasions an explosion, and the flame resulting is instantaneous and equally luminous throughout. The dark inner cone of a candle-flame (see **BLOWPIPE**) is formed by the volatilized tallow raised by the capillary action of the wick, together with carbonic oxide, carbonic acid gas and water vapor from the combustion going on in the outer part of the flame, and atmospheric nitrogen, but no free oxygen. By means of a short tube inserted into it, the inner cone of the flame may be made to yield up a portion of its contents; the application of a light to the other end of the tube shows that they are combustible. That within the flame they are not ignited may be demonstrated in many ways. Thus, if a piece of paper be depressed upon the flame for a few seconds, that part of it which touches the central part of the flame is not charred. Again, when a platinum wire is held horizontally in a candle flame, it is heated to redness at the two parts where it is in contact with the outer zones of combustion, remaining dark between them. In the intermediate, white-hot and luminous zone of the candle flame the oxidation of the gases yielded by the inner core is chiefly effected. The reducing effect of the flame is the greatest at the surface of contact of these two portions. On account of the slower combustion, the smaller proportion of unoxidized gases, and the greater penetration of oxygen at the upper part of the flame, the luminous zone is thicker, but less bright above than below. In the outer non-luminous zone or mantle, which envelops the whole flame except at its base, combustion is completed. The mantle may be conveniently observed by interposing a small piece of card between the luminous cone and the eye. At the base of the flame, reaching a little upward toward the inner cone, is a light blue zone.

The composition of wax and tallow flames, according



to Hilgard, is hydrogen, marsh-gas, olefiant gas, carbon monoxide, carbon dioxide, nitrogen in large proportion, and small quantities of substances condensable to solids or liquids.

Flames may be classed as luminous, such, *e.g.*, as those produced by the burning of wax, tallow, oils, and other carbonaceous substances, and metals; and non-luminous, as those of hydrogen, alcohol, sulphur, and carbon monoxide.

FLAMEL, NICOLAS, a reputed French alchemist, and a caligrapher to the university of Paris, was born about 1330. Becoming a money lender, he amassed immense wealth, with which he built a large number of churches and endowed various charities. He died at Paris, March 22, 1418, and was buried in the church of Saint-Jacques-la-Boucherie, to which he bequeathed the bulk of his property.

FLAMEN, a Roman sacrificial priest. The flamens were under the direction of the pontifices, and were consecrated to the service of some particular deity. The highest in rank were the Flamen Dialis, Flamen Martialis, and Flamen Quirinalis, who were always selected from among the patricians. When the number of flamens was raised from three to fifteen, those already mentioned were entitled *maiores*, in contradistinction to the other twelve, who were called *minores*, and were chosen from the plebs. The flamens were held to be elected for life, but they might be compelled to resign office for neglect of duty, or on the occurrence of some ill-omened event during the performance of their rites. The official dress of the flamens was the *apex* or cap (surmounted with a piece of pointed olive-wood, round the base of which a lock of wool was twisted), the *lana* or mantle, and a laurel wreath.

FLAMINGO, a Water-bird conspicuous for the bright scarlet or flame-colored patch upon its wings, and long known by its classic name, *Phenicopterus*, as an inhabitant of most of the countries bordering the Mediterranean Sea, in some of which it is still far from uncommon. Other species have since been discovered, and both its common and scientific names are now used in a general sense. The true position of the Flamingo has been much debated, and ornithologists are as yet by no means agreed upon it. Professor Huxley considers the form "so completely intermediate between the Anserine birds on the one side, and the Storks and Herons on the other, that it can be ranged with neither." And he puts it by itself as the type of a group *Amphimorphæ* under the larger assemblage of *Desmognathæ*. To the present writer its affinity to the *Anatidæ* seems on many accounts to be the strongest, but that it should stand as a distinct family is manifest.

FLAMININUS, TITUS QUINCTIUS, a Roman general and statesman, well known as the liberator of Greece, was born about 228, and died about 174 B.C. The patrician family of the Quinctii had already made their mark in Roman history, but of Titus' immediate ancestors nothing is known except that, according to the Fasti Capitolini, his father bore the same name. He began his public life as a military tribune under Marcellus. On the death of his commander he was appointed proprætor of Tarentum and the neighboring district. His administrative abilities were recognized even in this subordinate post, and in 202 B.C. he was appointed one of a commission of three to supplement the colony of Venusium, whose numbers had been drained by the war with Hannibal. In 199 B.C. he was made quæstor, and the next year, skipping the regular stages of ædile and prætor, he obtained the consulship, notwithstanding the opposition of the tribunes on account of his youth. The scanty records of his early years fur-

nish nothing which will adequately account for this marvelously rapid promotion, but it is explained and justified by his subsequent career. Flamininus was one of the first and most successful of the rising school of Roman statesmen, the opponents of the narrow and almost provincial patriotism of which Cato was the type, the disciples of Greek culture, and the advocates of a wide imperial policy. His winning manners, his polished address, his knowledge of men, and the personal fascination which was mainly owing to these qualities, and lastly his knowledge of Greek, which, according to Plutarch, he spoke like his native language, all marked him out as the fittest representative of Rome in the East, and it was an auspicious lot for Rome which assigned to the consul the province of Macedonia, and the conduct of the war with Philip. No sooner was he appointed than he set to work to collect new levies, selecting the picked veterans who had served in the Spanish and African campaigns. His predecessors in the province, Sulpicius and Publius, had been dilatory and incompetent, not quitting Rome till their year of office had nearly expired. Flamininus sailed in the early spring, and, leaving his troops at Corcyra to follow him, crossed in a single galley to the mainland and hurried to the Roman camp in Epirus, dismissed his predecessor Publius Villius, and in a council of war determined to storm the pass of Antigonea, a narrow gorge a little below Clisoura, which was occupied by the enemy. Repulsed in the direct attack, he consented to parley with Philip, and the two commanders met on the banks of the Aous and conversed across the narrow stream. Flamininus at once revealed his intended policy, and in stern and uncompromising terms demanded the liberation of Greece and Thessaly. Philip indignantly broke up the conference, exclaiming that harder terms could not have been proposed to him had he been conquered. This bold attitude of defiance and assertion of the claims of oppressed nationalities was in a great measure the secret of Flamininus' success. The news soon spread that a Roman had come, not to transfer the yoke of slavery, but to vindicate the liberties of Greece. Charops, an Epirot chieftain, revealed to Flamininus a by-path across the mountains by which the pass could be turned; a signal fire showed that the expedition had succeeded; and a simultaneous attack in front and rear completely routed the Macedonians, who were only saved from total destruction by the nature of the ground, which rendered pursuit impossible. Flamininus found himself master of Epirus, and he cemented a lasting friendship with the Epirots by his mildness and moderation, which contrasted with the extortions and ravages of Philip. From Epirus he passed into Thessaly, and took Phaloria, though he was obliged to raise the siege of Atrax on the Peneus. Thence he marched into Locris, where Anticyra served him as a basis for further operations, and enabled him to communicate with the fleet, which was commanded by his brother Lucius. Many towns in Phocis opened their gates to him, and Elatea, the capital, was taken after a long resistance. His principal efforts were now directed to win over the Achæan league, and in this he was so far successful that a conference of the Greeks was held near Nicæa, on the Meliæ gulf, under his presidency, to treat with Philip. A truce of two months was agreed to, on condition of the evacuation of all the towns of Phocis and Locris, to enable both parties to send deputies to Rome. The Greek deputies were instructed to demand the expulsion of Macedonian garrisons from Demetrias, Chalcis, and Corinth, as the only guarantee for the freedom of Greece. When the senate demanded of Philip's ambassadors whether he was ready to grant these terms, they replied that they had no instructions,



and were sent back and told to treat directly with Flamininus, whose command, which was just expiring, they extended for a second year. Flamininus, having thus secured his own object, showed no disposition to temporize with Philip, and the negotiations were abruptly broken off. The perfidy of Nabis, the tyrant of Sparta, secured him a valuable ally and the help of Argos, which Philip had delivered over to Nabis to garrison. Thebes, and with it Boeotia, was gained over partly by persuasion and partly by stratagem, and in the ensuing spring, 197 B.C., Flamininus took the field with nearly all Greece at his back. After a cavalry skirmish near Pheræ, the main armies met at Cynocephalæ, a low range of hills so called from a fanciful resemblance to dogs' heads. It was the first time that the Macedonian phalanx and the Roman legion had met in open fight, and the day decided which nation was to be the master of Greece, and perhaps of the world. It was a victory of intelligence over brute force, and, where numbers and courage were equally matched, the superior strategy and presence of mind of the Roman general turned the scale. The left wing of the Roman army was retiring in hopeless confusion before the deep and serried ranks of the Macedonian right led by Philip in person, when Flamininus, leaving them to their fate, boldly charged the left wing under Nicanor, which was forming on the heights. The phalanx was like a steam hammer, irresistible if it hit its object, but moving only in one direction, and easily thrown out of gear. Before the left wing had time to form, Flamininus was upon them, and a massacre rather than a fight ensued. This defeat was turned into a general rout by a nameless tribune, who collected twenty companies and charged in rear the victorious Macedonian phalanx, which in its pursuit had left the Roman right far behind. Eight thousand Macedonians were killed and 5,000 taken prisoners, while the Romans lost only 700. Macedonia was now at the mercy of Rome, and Flamininus might have dictated what terms he liked, but he showed his usual moderation and farsightedness in disregarding the root-and-branch politics of his Ætolian allies, whose heads were turned by the part they had taken in the victory, and contenting himself with his previous demands. Philip lost all his foreign possessions, but retained his Macedonian kingdom almost entire. Such a valuable bulwark against the outer world of Thracians and Celts was not lightly to be removed. Ten commissioners arrived from Rome to regulate the final terms of peace, and at the Isthmian games which were celebrated at Corinth in the spring of 196 B.C., a herald proclaimed to the assembled crowds that "the Roman people, and T. Quinctius, their general, having conquered King Philip and the Macedonians, declare all the Greek states which had been subject to the king henceforward free and independent." A shout of joy arose so loud that it was heard by the sailors in the harbor, and in Plutarch's time the legend told how birds flying over the course had dropped down stunned by the noise. The games were forgotten, and all crowded round the proconsul eager to kiss the hands of the liberator of Greece, who was almost smothered with chaplets and garlands. This day was indeed the climax of Flamininus' career, of which even the stately triumph that two years later he obtained at Rome must have seemed but a pale reflection.

Of the rest of his public life, which was mainly occupied in consolidating the fruits of the victory of Cynocephalæ, we can only give the barest outline; but we will first attempt to estimate his work, and discuss how far he merited the proud title of benefactor of Greece, which Greeks and Romans alike bestowed on him. That he was animated by an ardent love of Greek name

and race, as genuine as that of Byron, of Canning, or of Kanaris, admits of no reasonable doubt. To attribute to Flamininus a Macchiavellian policy, as if he could have foreseen Corinth overthrown and Achaia turned into a Roman province, is not only disingenuous, but absurd. There is more force in the charge which Mommsen brings against him, that his Hellenic sympathies prevented him from seeing the innate weakness and mutual jealousies of the Greek states of that period, whose only hope of peace and safety lay in submitting to the protectorate of the Roman republic. But if the event proved that the liberation of Greece was a political mistake, it was a noble and generous mistake, and reflects nothing but honor on the name of Flamininus.

The only military enterprise that remained after the conquest of Philip was to crush Nabis, who still held Argos, as well as his own tyranny of Sparta. In allowing the conquered tyrant to retain his native possessions, Flamininus was probably influenced by consideration for the Spartans, who would never, except under compulsion, have submitted to the Achæan league.

His last act before returning home is characteristic of the man. Of the Achæans, who vied with one another in showering up him honors and rewards, he asked but one personal favor, the redemption of the Italian captives who had been sold as slaves in Greece during the Hannibalic war. These to the number of 1,200 were presented to him on the eve of his departure, and formed the chief ornament of his triumph.

In 192 B.C., on the rupture between the Romans and Antiochus, Flamininus returned to Greece, this time as the civil representative of Rome. His personal influence and skillful diplomacy secured the wavering Achæan states, cemented the alliance with Philip, and contributed mainly to the victory of Thermopylæ. Chalcis and Naupactus, which had joined the enemy, owed their preservation to his interposition with the consul Glabrio. In 189 B.C. he was made censor. In this office his fair fame was sullied by an unseemly quarrel with Cato. Brotherly affection tempted him to shield from just punishment a dissolute and brutal ruffian. In 183 B.C. he undertook an embassy to Prusias, to induce the king of Bithynia to deliver up Hannibal. Hannibal forestalled his fate by taking poison, and his dying words justly stigmatized this pitiful victory over a defenseless and destitute old man. The only excuse for his conduct is that it was prompted not by wanton cruelty or love of revenge—motives which were wholly alien to his character—but by restless ambition and an inordinate love of glory, the infirmities of a truly noble nature. The history of his later years is a blank, and we only learn from his biographer Plutarch that his end was peaceful and happy.

FLAMINIUS, CAIUS, an eminent member of the plebeian gens Flaminia, who in the course of fifteen years of public life (232–217 B.C.) held successively the offices of tribune, prætor, and censor, and was twice advanced to the consular dignity. During his tribuneship (232 B.C.) he was successful in carrying a measure for distributing *virgatum* among the plebeians, in terms of the Licinian law, the ager Gallicus Picenus, an extensive tract of newly-acquired territory lying along the east coast of the peninsula to the south of Ariminum. This law was carried in face of the determined opposition of the entire senatorial party, who, according to Valerius Maximus (lib. v., c. 4, sec. 5), at one stage threatened to declare him a public enemy and raise an army against him should he persevere in his agitation. In 227 B.C. he was appointed prætor, Sicily being assigned to him as his province; and there he so conducted himself as to win the lasting gratitude of the people whom he governed. This they took occasion to



show thirty years afterward when his son was curule ædile. In 223 B.C. he was made consul, and, along with his colleague P. Furius Philus, hastened at once to the north to prosecute the Gallic war, which had been occasioned, it is said, by the operation of his own agrarian law, and which had been going on with indecisive results since 225. Rashly crossing the Po near the site of Piacenza, he sustained a check which compelled him to capitulate. The facile Insubres having granted him a fair retreat, he speedily, in conjunction with the Cenomani, renewed the attack at another point, perhaps on the river Oglio. On this occasion he was successful; but it seems very doubtful whether the victory was not gained in spite of, rather than by means of, the generalship of the consul. At all events his conquest of the Insubres failed to make any impression on the aristocratic party who had opposed his election and afterward sought to obtain his recall; and the honors of a triumph were awarded to him only when the negative decision of the senate had been overborne by the popular voice. According to Plutarch (*Marcellus*, 4) he was nevertheless compelled to resign his office before the natural term expired. In 221 he was chosen magister equitum under the dictatorship of M. Minucius Rufus, but was not permitted to take office owing to a bad omen—the squeaking of a shrew-mouse—which had occurred immediately after the election. In the following year (220 B.C.) he was censor; and this period of office was marked by the execution of two great public works which are permanently associated with his name—a circus and a road. The Circus Flaminius, erected in a locality which had previously been known as the Prata Flaminia, was designed for the accommodation of the plebeians, especially for their public meetings—they having no right at that period to sit in the Circus Maximus. The Via Flaminia was the first to be carried across the Apennines, thus connecting the Adriatic and Tuscan seas. It was a continuation of the old military road which had been carried as far as to Spoletium (Spoleto) in 240 B.C. In 218 B.C., as a leader of the democratic opposition, Flaminius was one of the chief promoters of the measure brought in by the tribune Claudius, which prohibited senators and senators' sons from possessing seagoing vessels, except such as might be necessary for the transport of the produce of their own estates, and generally shut them out from everything which the Romans included under the category of commercial speculation (*quæstus*), such as undertaking public contracts (*redemptiones*), and the like. The effective support which he had given to this measure vastly increased the popularity of Flaminius with his own order, and secured his second election as consul in the following year (217 B.C.), shortly after the defeat of Sempronius at the Trebia. Without staying to go through the usual solemnities of installation at the Capitol, or to celebrate the *feriæ Latinæ*, Flaminius at once hastened to Ariminum and thence to Arretium, there to be ready for an aggressive campaign against Hannibal as soon as the roads should be open. Meanwhile Hannibal, uneasy in his winter quarters, had accomplished with comparative ease the passage of the Apennines, and forced his way southward across the flooded plains of the lower Arno. The consul, fearing lest the enemy should find Rome unprotected, impetuously set out in pursuit. Free to select his own ground, Hannibal chose to make his stand between Borghetto and Passignano, in the narrow defile formed by the hills of Cortona, which is closed at its entrance by the Trasimene lake. With the main body of his infantry he barred the further outlet at the hill of Torre, while the light troops and the cavalry were posted on the sides of

the pass. It was early morning (on June 23d, according to the uncorrected calendar, but in reality on some day in April) when Flaminius reached the spot, and a thick haze covering hill and lake altogether concealed the position and even the existence of the enemy, until the Roman army found itself completely and hopelessly surrounded in the fatal defile. In the three hours' carnage that followed 15,000 Romans perished, and Flaminius was among the slain.

FLAMINIUS, CAIUS, son of the preceding, was quæstor under P. Scipio Africanus the elder in Spain in the year 210 B.C., and took part in the capture of New Carthage. Fourteen years later he was curule ædile; and this term of office was marked by the distribution among the citizens at very low prices of large quantities of grain, which in a time of Roman scarcity the Sicilians had sent in grateful remembrance of his father's prætorship thirty years before. In 193 B.C. he himself attained a prætorship, and was sent to the recently constituted province of Hispania Citerior. There he carried on the war against the insubordinate populations, and after a siege took Litabrum, a city which is described by Livy as having been strong and opulent, and made prisoner Corribilo, a powerful chieftain. In 187 B.C. he became consul along with M. Æmilius Lepidus, and was successful in giving peace to Northern Italy by the subjugation of the warlike Ligurian tribes. In the same year the branch of the Via Æmilia (traces of which are still discernible) connecting Bononia (Bologna) with Arretium (Arezzo) was constructed by him.

FLAMSTEED, JOHN, the first astronomer-royal of England, was born at Denby near Derby, August 14, 1646. About the year 1667 he wrote an able paper on the equation of time, afterward appended by Wallis to his edition of Horrocks' works. In 1669 he communicated a paper to the Royal Society under the assumed name J. Mathesin, a sole fundes, an anagram on his own name Johannes Flamsteedius; but Oldenburg, the secretary, addressed a reply to him, showing that he was discovered, and from that time Flamsteed corresponded with many men of science. Sir Jonas Moore, whose acquaintance he made in 1670, when visiting London, furnished him with several instruments, among others with Townley's micrometer. In 1673 Flamsteed composed his treatise on *The true and apparent Places of the Planets when at their greatest and least Distances from the Earth*, a work referred to by Newton in the first edition of his *Principia*. In the same year he obtained his M.A. degree at Cambridge. He does not appear to have ever studied at Cambridge, though his name was entered at Jesus College in 1670, and he resided there for some months in 1674. In this year he published his *Ephemeris*, and drew up a table of the tides. Sir J. Moore at this time proposed to establish Flamsteed in a private observatory at Chelsea; but Charles II., whose attention had been directed to the necessity of improved astronomical tables by a proposal for finding the longitude at sea, determined to establish an observatory, and Flamsteed was appointed "astronomical observator." His observations were made at the queen's house in Greenwich Park, till July, 1676, when the observatory was ready. Of his work as astronomer-royal an account will be found under ASTRONOMY. Baily dates the commencement of modern astronomy from the year 1676, when Flamsteed began his observations.

From 1715 to 1719, the year of his death, Flamsteed superintended the publication of the *Historia Cælestis*, but the publication was not completed till 1723. His valuable *Atlas Cælestis* was not published till 1753. The well-known British catalogue of 2,884 stars appears



in the third volume of the *Historia Callestis*. Though of feeble constitution, Flamsteed attained the age of seventy-three, his death occurring on the last day of the year 1719.

FLANDERS, an ancient countship of the Low Countries, which has left its name to two provinces of the modern kingdom of Belgium, distinguished as East and West. It took its rise about the time of Charles the Great, but the early history of the line of counts is far from certain, the older chronicles giving very different statements. Leaving out of view those mythical personages through whom as a matter of course a connection is established with Priam of Troy, we find the founder of the family of the Foresters, as they are called, in a certain Lideric le Buc, "only son of Saluart prince of Dijon, and of Madame Eringarde, daughter of Gerard, lord of Rossillon," who, says Lambert, canon St. Omar, "videns Flandriam vacuum et incultam ac memorosam, occunavit eam." Even Lideric is of doubtful authenticity, though his death in 836 is mentioned in the *Annales Blandinienses*, which were compiled before 1064 from earlier documents. His son, Ingelramn, says the chronicles, had a son, Audacer; but according to several modern investigators, Audacer was merely a cognomen of Baldwin, the next person in the genealogical series. With Baldwin, who is distinguished as *Bras de Fer* or *Iron Arm*, we at length reach the *terra firma* of history. He was a strong, daring, and unscrupulous man, and made noise enough in his own day, more particularly by carrying off and marrying Judith, daughter of Charles the Bald of France, a lady of easy principles, who had already been the wife of Æthelwulf of the West Saxons of England, and for a time of Æthelwulf's son, Æthelbald. Baldwin II., the Bald, born of this marriage, is mainly remembered as a vigorous opponent of the Normans, and as the builder of the walls of Bruges and Ypres. It is said that he also laid the foundation of the political liberties of his country by appointing twelve of his principal vassals as a council of state. He took to wife Ælfthryth, daughter of King Alfred of England. On his death in 918, his possessions were divided between his two sons Arnulf the elder and Adolphus; but the latter survived only a short time, and Arnulf succeeded to the whole inheritance. His reign was full of troubles with the Normans on the one hand, and with the emperor Otho I. on the other; and he made one of his conferences memorable by murdering William Longsword, the Norman duke. In his old age he placed the government in the hands of Baldwin, his son by Adela, daughter of the count of Vermandois, and the young man, though his reign was a very short one, did a great deal for the commercial and industrial progress of the country, establishing the first weavers and fullers of Ghent, and instituting yearly fairs at Ypres, Bruges, Veurne, Cassel, Courtrai, Thorout, and Rousselare. On Baldwin's death in 961, the old count resumed the control, and spent the few remaining years of his life in securing the succession of his grandson Arnulf or Arnold the younger. The reign of Arnulf was terminated by his death in 989, and he was followed by his son Baldwin IV., styled *Pulchra Barba*, Comely Beard, or simply *Barbatus*, Met den Baerd, with the beard. This Baldwin fought successfully both against the king of France and the emperor Henry II., and obtained from the latter Valenciennes, Walcheren, and the islands of Zeeland. The counts of Flanders thus became feudatories of the empire as well as of France. Baldwin's son, Baldwin V., surnamed of Lille (in Latin *Insularius*, in Dutch *Van Ryssel*) rebelled in 1028 against his father, at the instigation of his wife Adela, daughter of Robert of France; but two years later peace was sworn

at Oudenarde, and the old man continued to reign till his death in 1036. Baldwin V. proved a worthy successor, and acquired from the people the title of *Debonnaire*. He was an active, ambitious, enterprising man, and greatly extended his power by wars and alliances. Before his death he saw his eldest daughter Matilda, sharing the English throne with William the Conqueror, his son Baldwin of Mons (in Dutch Bergen) in possession of Hainault, in right of his wife Richilde the widow of the late count, and his son Robert the Frisian ruling over the countship of Holland and Friesland in right of the countess Gertrude. His younger daughter Judith had married Tostig, brother of Harold IV. of England. On his death in 1067, Baldwin of Mons succeeded to the countship of Flanders, apparently without opposition on the part of Robert, his elder brother; but a few years afterward a quarrel broke out, and Baldwin was slain. Robert now claimed the tutelage of Baldwin's children, and obtained the support of the emperor Henry IV.; while Richilde, Baldwin's widow, appealed to Philip of France. The contest was decided at Ravenchoven, near Cassel, February 22, 1071, where Robert was victor, and Arnulf III., Baldwin's son, was slain. Arras, Douai, Tournai, and other towns of French Flanders, had taken part with the countess and the French, while Ghent, Bruges, Ypres, Courtrai, and other towns of Flanders proper were on the other side of Robert. The successful competitor held the countship till his death in 1093, when he was succeeded by his son Robert II., who became famous for his exploits in the first crusade, and acquired the title of *Lance and Sword of Christendom*. Baldwin VII., surnamed *À la Hache*, or *With the Axe*, became count on Robert's death in 1119, and in his turn transmitted the dignity to his cousin Charles of Denmark, son of Canute and Adelais, daughter of Robert the Frisian. This Charles of Denmark was a religious enthusiast, and exercised his authority against all swearers, necromancers, Jews, and usurers. At Bruges, in 1127, he ordered all the granaries to be thrown open; and the merchants who had expected to make gain by the dearth were so enraged that they formed a conspiracy and procured his assassination in the church of St. Donat. No fewer than six pretenders to the countship now appeared, and among the rest William Clito, son of Robert Courthose of Normandy, and Thierry or Theodoric of Alsace. The latter was the successful competitor, and he married the widow of Count Charles, Marguerite of Clermont. He distinguished himself at home by the wise encouragement which he gave to the growth of popular liberty, and abroad by the part which he took in several crusading expeditions. In the latter years of his life he retired to Gravelines, leaving the cares of state to his son Philip, who, when he came to rule in his own name, followed in his father's footsteps, and acquired the honorable reputation of "the greatest lawgiver of Flanders." He married Elizabeth of Vermandois, and on her death had a violent dispute with the French monarch about the possession of Vermandois, which was ultimately granted him during his life. As he had no children his inheritance went to Baldwin of Hainault, who had married his sister Marguerite,—a change of the dynasty which considerably affected the relations of Flanders with France. The French king laid claim to the countship, and Baldwin was constrained to cede Artois, St. Omers, Lens, Hesdin and a great part of southern Flanders to France, and to allow Matilda of Portugal, the widow of Philip, to hold Lille, Cassel, Veurne, Rille and Sluys. Marguerite died in 1194 and Baldwin in 1195, and the countship devolved on their son Baldwin IX., who became the founder of the Latin empire at Constantino-



ple, and perished in Bulgaria in 1206. The emperor's two daughters were both under age, and accordingly the government of Flanders and Hainault was intrusted to his brother Philip, assisted by Bosschaert of Avesnes and William of Hainault. Johanna, the elder daughter, was married to Ferdinand, or Ferrand, of Portugal, but left no heir; and so the inheritance of both Flanders and Hainault passed, on her death in 1279, to the children of the younger, Margaret — the latter to John, her eldest son by her first marriage with Bosschaert of Avesnes, and the former to Guy of Dampierre, a son of her second marriage with William of Dampierre, a French nobleman. The government of Guy proved an unfortunate one; Flanders was involved in a severe struggle with France, and for a time almost lost its independence. The old count died at Compiègne in prison about two months after peace was concluded, in 1305; and Robert of Bethune, his son, was acknowledged his successor both by the Flemings and by the French. Robert was an able and valiant prince, and has the honor of having established at Bruges the first insurance company. The reign of his grandson and successor, Louis of Nevers and Rethel, who had been brought up at the French court and married to Margaret, the French king's daughter, was rendered forever memorable by the enterprise of Jacob van Artevelde, the great hero of Flemish liberty. Louis perished in the battle of Crecy, and left his county to his son, Louis II., of Male, near Bruges, under whom the struggle of the Flemish towns for their liberties was maintained. By the marriage of Louis' daughter Margaret with Philip of Burgundy, the lordship of Flanders passed to the Burgundian family; and thus it ultimately became part of the possessions of the house of Austria. The title of count of Flanders has been borne since 1840 by the second son of Leopold I. of Belgium, Philip Eugene Ferdinand.

FLANDRIN, JEAN HIPPOLYTE, French painter, was born at Lyons in 1809. His father, though brought up to business, had great fondness for art, and sought himself to follow an artist's career. Lack of early training, however, disabled him for success, and he was obliged to take up the precarious occupation of a miniature painter. Hippolyte was the second of three sons, all painters, and two of them eminent, for the third son Paul is one of the leaders of the modern landscape school of France. Auguste, the eldest, passed the greater part of his life as professor at Lyons, where he died in 1840. After studying for some time at Lyons, Hippolyte and Paul, who had long determined on the step and economized for it, set out to walk to Paris in 1829, to place themselves under the tuition of Hersent. They chose finally to enter the atelier of Ingres, who became not only their instructor but their friend for life. At first considerably hampered by poverty, Flandrin's difficulties were forever removed by his taking, in 1832, the Grand Prix de Rome, awarded for his picture of the *Recognition of Theseus by his Father*. This allowed him to study five years at Rome, whence he sent home several pictures which considerably raised his fame. *St. Clair Healing the Blind* was done for the cathedral of Nantes, and years after, at the exhibition of 1855, brought him a medal of the first class. *Jesus and the Little Children* was given by the Government to the town of Lizieux. *Dante and Virgil Visiting the Envious Men Struck with Blindness*, and *Euripides Writing His Tragedies*, belong to the museum at Lyons. Returning to Paris through Lyons in 1838, he soon received commission to ornament the chapel of St. John in the church of St. Séverin at Paris, and reputation increased and employment continued abundant for the rest of his life. Besides the pictures mentioned above,

and others of a similar kind, he painted a great number of portraits. The works, however, upon which his fame most surely rests are his monumental decorative paintings. In 1863 his failing health, rendered worse by incessant toil and exposure to the damp and draughts of churches, induced him again to visit Italy. He died of small-pox at Rome on March 21, 1864.

FLANNEL, an open woolen stuff of various degrees of fineness, from patent flannel, which does not shrink in washing, to baize, which is a coarse woolen stuff, or flannel with a long nap, first introduced in England, together with serge, by the Flemings. Domett is another variety of flannel, made of cotton and wool.

FLATBUSH, a town of Kings county, N. Y., about four miles southeast of Brooklyn, with which it is connected by street car lines. It is practically a residential suburb of Brooklyn, and is close to Prospect Park, which belongs to that city. There are many handsome residences and some scholastic institutions here. The population (1890) is 15,000.

FLAT-FISH is the name common to all those fishes which swim on their side, as the halibut, turbot, brill, plaice, flounder, sole, etc. The side which is turned toward the bottom, which in some kinds is the right, in others the left, is generally colorless, and called "blind," from the absence of an eye on this side. The opposite side, which is turned upward and toward the light, is variously, and in some tropical species even vividly, colored, both eyes being on this side the head.

FLAVEL, JOHN, an English Nonconformist divine, was born at Bromsgrove, Worcestershire, England, probably in 1627. Soon after taking orders in 1650 he obtained a curacy at Deptford, and on the death of the vicar he was appointed to succeed him. From Deptford he removed in 1656 to Dartmouth. He was ejected from his living by the passing of the Act of Uniformity in 1662, but continued to preach and administer the sacraments privately till the Oxford Act of 1665, when he retired to Slopton, five miles from the scene of his official labors. After the expulsion of the Stuart dynasty he became minister of a Nonconformist church at Dartmouth, where he labored till his death in 1691.

FLAVIAN I., patriarch of Antioch, was born about 320, most probably in Antioch. He lost his parents in early youth, and, although inheriting great wealth, he renounced a life of worldly ease, and resolved to devote his riches and his talents to the service of the church. In association with Diodorus, afterward bishop of Tarsus, he supported the catholic faith against the Arian Leontius. When Meletius was appointed patriarch of Antioch in 361, he raised Flavian to the priesthood, and on the death of Melëtius in 381, Flavian was chosen, by a majority of the bishops, to succeed him. During the patriarchate of Flavian a serious sedition occurred in the streets of Antioch (387), and the statues of Theodosius and the empress were overturned; but Flavian went to Constantinople, and by an eloquent discourse, prepared for him, it is said, by his pupil St. John Chrysostom, succeeded in averting the emperor's vengeance from the city. Flavian died in 404.

FLAVIAN II., patriarch of Antioch, was chosen by the emperor Anastasius I. to succeed Palladius, most probably in 498. He endeavored to please both parties by steering a middle course in reference to the Chalcedon decrees, but was induced, after great hesitation, to agree to the request of Anastasius that he should accept the Henoticon. His doing so, while it brought upon him the anathema of the patriarch of Constantinople, failed to secure a return of the favor of Anastasius, who, in 511, found in the riots which were occurring between



the rival parties in the streets of Antioch a pretext for deposing Flavian, and banishing him to Petra, where he died in 518. Flavian was, soon after his death, enrolled among the saints of the Greek Church, and, after some opposition, he was also canonized by the Latin Church.

FLAVIAN, patriarch of Constantinople, succeeded Proclus in 447. He presided at the council which deposed Eutyches in 448, but in the following year he was deposed by the council of Alexandria, which reinstated Eutyches in his office. Not satisfied with the mere deposition of Flavian, his opponents were so carried away by their feelings as to proceed to personal violence, and his death soon after, at Hypæpa in Lydia, is attributed to a kick inflicted on him by Dioscorus, patriarch of Alexandria, the president of the council. The council of Chalcedon canonized him as a martyr, and he is also enrolled in the martyrology of the Latin Church, his day being February 18th.

FLAVIGNY, VALERIEN, was born near Laon about the beginning of the seventeenth century. Having studied in the college of Sorbonne, he received from it his doctor's diploma in 1628, and shortly afterward obtained a canonry in the cathedral of Rheims. In 1630 he became professor of Hebrew in the college of France. He died at Paris April 29, 1674. The works of Flavigny are chiefly occupied with discussions regarding the Hebrew text of the Bible. His opinions acquired him for a time considerable celebrity, and engaged him in controversies with some of the doctors of the Sorbonne, but now possess scarcely any interest.

FLAVIN is an extract or preparation of quercitron bark used as a yellow dye in place of the ground and powdered bark.

FLAX. The terms flax or lint are employed at once to denote the fiber so called, and the plant from which it is prepared. The flax plant belongs to the natural order *Linacæ*, and, like most plants which have been long under cultivation, it possesses numerous varieties, while the wild or parent condition is not known. As cultivated it is an annual with an erect stalk rising to a height of from twenty to forty inches, with alternate, sessile, linear-lanceolate leaves branching only at the top into a corymbose panicle of bright blue flowers. The flowers are regular and symmetrical, having five ovate-acute, slightly ciliate sepals, five deciduous petals, and a syncarpous pentacarpellary ovary with five distinct styles. The fruit or boll is round, containing five cells or loculaments, each of which is divided into two by a spurious dorsal dissepiment, thus forming ten divisions, each of which contains a single seed. The seeds, well known as linseed, are flat, oval in form, dark brown in color, with a smooth shining mucilaginous coat, and flat oily cotyledons. There are several other species which have been and are cultivated to an inconsiderable extent as sources of fiber, as the Greek or spring flax, Siberian flax and the white blossomed or purging flax, all grown in certain parts of Austria, and the narrow-leaved flax which was utilized at a very remote period.

The cultivation and preparation of flax are the most ancient of all textile industries, very distinct traces of their existence during the stone age being preserved to the present day. "The use of flax," says Keller (*Lake Dwellings of Switzerland*), "reaches back to the very earliest periods of civilization, and it was most extensively and variously applied in the lake dwellings, even in those of the stone period. But of the mode in which it was planted, steeped, hackled, cleansed, and generally prepared for use, we can form no idea any more than we can of the mode or tools employed by the settlers in its cultivation. \* \* \* \* Rough or unworked flax is found in the lake dwellings made into bundles, or what

are technically called heads, and, as much attention was given to this last operation, it was perfectly clean and ready for use." As to its applications at this early period, Keller remarks—"Flax was the material for making lines and nets for fishing and catching wild animals, cords for carrying the earthenware vessels and other heavy objects; in fact, one can hardly imagine how navigation could be carried on, or the lake dwellings themselves be erected, without the use of ropes and cords; and the erection of memorial stones (menhirs, dolmens) at whichever era, and to whatever people these monuments may belong, would be altogether impracticable without the use of strong ropes." As to the variety of flax cultivated by the prehistoric races, Dr. Heer is of opinion that it was the small-leaved flax, a plant native of the Mediterranean coasts from Greece and Dalmatia to the Pyrenees.

That flax was extensively cultivated and was regarded as of much importance at a very early period in the world's history there is abundant testimony. Especially in ancient Egypt the fiber occupied a most important place, linen having been there not only generally worn by all classes, but it was the only material the priestly order was permitted to wear, while it was most extensively used as wrappings for embalmed bodies and for general purposes.

The celebrated Courtrai flax of Belgium is the most valuable staple in the market, on account of its fineness, strength and particularly bright color. There the flax is dried in the field and housed or stacked during the winter succeeding its growth, and in the spring of the following year, it is retted in crates sunk in the sluggish waters of the river Lys. After the process has proceeded a certain length, the crates are withdrawn, and the sheaves taken out and stooked. It is thereafter once more tied up, placed in the crates, and sunk in the river to complete the retting process; but this double steeping is not invariably practiced. When finally taken out, it is unloosed and put up in cones, instead of being grassed, and when quite dry it is stored for some time previous to undergoing the operation of scutching. In all operations the greatest care is taken, and the cultivators being peculiarly favored as to soil, climate and water, Courtrai flax is a staple of unapproached excellence.

FLAXMAN, JOHN, was the greatest sculptor, or, if that title may be disputed on account of certain technical shortcomings in his work, at any rate the greatest designer of sculpture that England has produced; and as a representative of the Greek spirit in modern art his name stands among the foremost, not of England merely, but of the world. He was born July 6, 1755.

At eleven years old, and again at thirteen, he won prizes from the Society of Arts. At twelve he became a public exhibitor in the gallery of the Free Society of Artists, and at fifteen in that of the Royal Academy, then in the second year of its existence. In the same year, 1770, he entered as an academy student, and won the silver medal. But all these successes were followed by a discomfiture. In the competition for the gold medal of the academy, Flaxman, who had made quite sure of victory, was defeated, the prize being adjudged by the president, Sir Joshua Reynolds, to another competitor named Engleheart. But this reverse proved no discouragement, and the young Flaxman continued to ply his art diligently, both as a student in the schools and as an exhibitor in the galleries of the academy, occasionally also attempting diversions into the sister art of painting. For twelve years, from his twentieth to his thirty-second (1775-1787), Flaxman subsisted chiefly by his work for the firm of Wedgwood.

By 1780 Flaxman had begun to earn something in an-



other, and, so to speak, a more legitimate branch of his profession. This was in the sculpture of monuments for the dead. Three of the earliest of such monuments by his hand are those of Chatterton in the church of St. Mary Redcliffe at Bristol, of Mrs. Morley in Gloucester Cathedral, and of a widow comforted by an angel, in the cathedral at Chichester. During the rest of Flaxman's career memorial bas-reliefs of the same class occupied a principal part of his industry; they are to be found scattered in many churches throughout the length and breadth of England, and in them all the finest qualities of his art are represented. The best are quite unsurpassable for pathos, for simplicity, for an instinct of composition as just, pure, and lovely as that of the Greeks themselves, and for the alliance with those harmonious lines and groupings of the ancients of that spirit of domestic tenderness and innocence which is the secret, and the holiest secret, of the modern soul.

In 1822 he delivered at the Academy a lecture in memory of his old friend and generous fellow-craftsman, Canova, then lately dead; in 1823 he received from A. W. Von Schlegel a visit of which that writer has left us the record. From an illness occurring soon after this he recovered sufficiently to resume both work and exhibition, but on December 25, 1826, he caught cold in church, and died three days later, in his seventy-second year.

FLEA, an Anglo-Saxon name, probably derived from "fleogan," to fly, typically applied to *Pulex irritans*, a blood-sucking insect-parasite of man and other mammals, remarkable for its powers of leaping, and unfortunately too well known, even in our own temperate climates.

FLÉCHIER, ESPRIT, bishop of Nismes, a respectable author, and one of the most celebrated preachers of his age, was born at Pernes, department of Vaucluse, on June 10, 1632, and educated at Tarascon sur Rhône, in the college of the Fathers of the Congregation of Christian doctrine, of which his uncle, Hercule Audifret, also famous in his time for his talents as a preacher, was general. In 1659 he became a professor of rhetoric at Narbonne, and there pronounced the funeral oration of M. de Rebé, archbishop of that city. A few months afterward, the death of his uncle called him to Paris, where he laid aside the habit of the doctrinaire, and at first followed the humble occupation of a parochial catechist. He soon made himself known by his poetical compositions in Latin and French. In 1660, he addressed to Cardinal Mazarin a poem called *Carmen Eucharisticum* celebrating the Peace of the Pyrenees; the following year he sang the birth of the dauphin in another poem (*Genethliacon*); but what first made him famous was a description in Latin verse of a brilliant tournament (*carrousel*), *Circus Regius*, given by Louis XIV., in 1662. Chapelain, the most influential critic of that time, brought his name under the notice of Colbert, with the remark, "Fléchier est encore un très bon poète latin."

The funeral oration of the Duchess d'Aiguillon (1675), and, above all, that of Turenne (1676), and, with that of Madame de Montausier, his masterpieces in that branch of literature. The favors of the court now poured in upon Fléchier. The king gave him successively the abbacy of St. Leverin, in the diocese of Poitiers, the office of almoner to the dauphiness, and in 1685 the bishopric of Lavaur, from which he was, in 1687, promoted to that of Nismes. Here Fléchier had occasion for the daily exercise of his great qualities, gentleness and moderation. The edict of Nantes had been repealed two years before; but the Calvinists were still very numerous at Nismes, and the sincerity of the conversion of such as had made abjuration was at best

but doubtful. Fléchier, by his prudent conduct, in which zeal was tempered with charity, succeeded in bringing over some of them to his views, and made himself esteemed and beloved even by those who declined to change their faith. During the troubles in the Cévennes, he softened to the utmost of his power the rigor of the edicts, and showed himself so sensible of the evils of persecution, and so indulgent even to what he regarded as error, that his memory was long held in veneration amongst the Protestants of that district. In the famine which succeeded the winter of 1709, he did much to alleviate the prevalent distress, by assisting the poor in his diocese without regard to their religious tenets, declaring that all alike were his children. He died at Montpellier, on February 16, 1710, at the advanced age of seventy-eight.

FLECKNOE, RICHARD, a poet and dramatic writer in the reign of Charles II. He was an Irishman by birth, and was originally a priest of the order of Jesus. Like many of the small wits and minor poets of that day, Flecknoe owes the rescue of his name from oblivion to the satirical genius of Dryden. That satirist availed himself of Flecknoe's name as a stalking horse from behind which to assail the poetaster Shadwell, who had been appointed to replace him in the laureateship.

FLEETWOOD, JOHN, one of the most distinguished theologians of the last century, was born about 1730. His most noted works are *The Christian Dictionary* (1773) and *The Life of Christ and Lives of the Apostles* (1813). He died in the early years of the present century. His works are yet standard on the subjects treated.

FLEETWOOD, or FLEETWOOD-ON-WYRE, a market-town, watering-place, and seaport of Lancashire, England, twenty-two miles by rail from Preston.

FLEETWOOD, CHARLES, lord-deputy of Ireland under the Commonwealth, and son-in-law of Cromwell, was born most probably in 1620. Entering the ranks of the parliamentary forces, he rose in 1644 to the rank of colonel of horse, and in 1645 was appointed governor of Bristol. At the battle of Dunbar, in 1650, he was lieutenant-general of the horse; and at the battle of Worcester, in 1651, the division commanded by him contributed chiefly to the victory of the parliamentary army. After the death of his first wife he was married to Bridget, eldest daughter of Cromwell and widow of Ireton; and in the same year he was appointed commander-in-chief of the forces in Ireland. In 1654 he became lord-deputy, but manifested such weakness and irresolution in dealing with the different political parties of Ireland that Cromwell in 1655 found it necessary to recall him. He was honored shortly afterward, however, by being nominated one of the fourteen major-generals to whom the internal administration of the Commonwealth was intrusted. On the death of the Lord Protector he made an attempt, by means of his influence with the troops, to supplant Richard Cromwell; but he wanted sufficient ability and energy to carry out his purpose, and in the midst of his intrigues the nation recalled the exiled Stuarts. Fleetwood's prominent position marked him out as an object of vengeance to the restored king, and it was only with very great difficulty that he escaped with his life. Not long after the Restoration he died in wretchedness and obscurity at Stoke Newington, whither he had retired.

FLEETWOOD, WILLIAM, a learned English bishop, was descended of an ancient family in Lancashire, and was born in the Tower of London, January 21, 1656. He died at Tottenham, Middlesex, on August 4, 1723. Bishop Fleetwood was regarded as the best preacher of his time, and his character stood deservedly high in general estimation.



**FLEMING, PAUL**, a German poet, was born at Hartenstein, a village in Saxony, on October 5, 1609. His father, a clergyman, was transferred while Paul was still a child to a higher post at Wechselburg; and here, on the charming banks of the Mulda, Fleming grew to boyhood, being treated with great affection by a kind and intelligent stepmother. From about the age of fourteen he attended school in Leipsic, and five or six years later he became a student at the university of that town. He was a youth of manly and generous character, and soon gave evidence of poetical talent in the occasional verses he was already fond of writing. He had many friends among his fellow-students, and keenly enjoyed his life in Leipsic; but in 1633 he was driven away by the horrors of the Thirty Years' War. It happened that about this time the duke of Holstein had resolved to send an embassy to Persia, with the view of opening for his subjects new channels of trade. Through Olearius, who was secretary of the embassy, and afterward wrote an interesting account of its proceedings, the young poet heard of the duke's purpose. Fired by the prospect of foreign travel, and with a vague idea that great results might be achieved by bringing East and West into closer contact, he went to Holstein and offered the duke his services. The offer was accepted; and when, a few months later, the embassy started, Fleming accompanied it as a subordinate official. Difficulties arose at Moscow, and the chiefs of the expedition returned to Holstein for instructions, leaving the inferior members, among them Fleming, at Revel. Here they were detained for more than a year, but had no reason to regret the fact, since there were in Revel many cultivated German families who received him with pleasure. In the spring of 1636 the embassy set off anew, and it was absent rather more than three years, reaching Ispahan in 1637, and passing through many stirring adventures on the way. The pleasure of the enterprise was marred by the tyrannical disposition of one of the leaders; but if we may judge from the buoyant tone of the poems written during the journey, Fleming must have had many happy hours amid the strange scenes he visited. In April, 1639, he found himself once more in Revel, and as a lady who had promised to become his wife had married during his absence; he now wooed a certain Fräulein Anna, who had been too young during his former visit to attract his notice. At Leipsic he had attended lectures in medicine, and after his betrothal it occurred to him to settle in Revel as a physician. He went to Leyden, and obtained a diploma; but the fatigues of travel had helped to undermine his constitution, and on his way back to Revel he died at Hamburg, April 2, 1640, when little more than thirty years of age, but leaving behind him poetry which is still read.

**FLEMMING, or FLEMMYNGE, RICHARD** (died 1431), bishop of Lincoln, and founder of Lincoln College, Oxford, was born at Crofton, Yorkshire. He was descended from a good family, and was educated at University College, Oxford. Having taken his degrees, he was made prebendary of York in 1406, and the next year was one of the proctors of the university. At this period of his life he embraced the doctrines of Wickliffe, and by his earnest advocacy won over many persons, some of high rank, to the side of the Reformer. But by some means a change was wrought in him, and he not only ceased to speak against the corruptions of the Roman system, but became one of Wickliffe's most determined opponents. Before 1415 he was instituted to the rectory of Boston in Lincolnshire, and in 1420 he was consecrated bishop of Lincoln. In 1424 he attended the council of Siena, a continuation of the council of Constance, and in the presence of the pope, Martin V., made an eloquent

speech in vindication of his native country. It was probably on this occasion that he was named chamberlain to the pope. To Bishop Flemming was intrusted the execution of the decree of the council for the exhumation and burning of Wickliffe's remains. The see of York being vacant, the pope conferred it on Flemming; but in consequence of the vehement opposition of Henry V. to the project, it was given up, and Flemming remained bishop of Lincoln. In 1427 he obtained the royal license empowering him to found a college at Oxford for the special purpose of training up disputants against Wickliffe's heresy.

**FLENSBURG, or FLENSBORG**, the capital of a circle in the government district of Schleswig-Holstein, Prussia, is situated at the head of the Flensburg Ford, twenty miles north by west of Schleswig. It is the most important commercial town in what was formerly the duchy of Schleswig.

**FLETCHER, ANDREW**, of Saltoun, was born in East Lothian, Scotland, in 1653, and died in 1716. He was a commissioner to the Scottish parliament, and was outlawed and his estates confiscated on account of his opposition to the arbitrary measures of the crown. He took part in Monmouth's rebellion in 1685, and was active in bringing William of Orange to England three years later. His estates were restored to him, and he again entered the Scottish parliament, where he opposed the Act of Union. He holds a prominent place in the list of Scottish authors.

**FLETCHER, GILES**, English poet of the seventeenth century, was born in London about 1584. He was the second son of Dr. Giles Fletcher, nephew of Richard Fletcher, bishop of London, cousin of John Fletcher the dramatist, and younger brother of Phineas Fletcher. In 1610 he published his great poem of *Christ's Victory and Triumph*, of which a second edition appeared in 1632. In 1612 he edited the *Remains* of his cousin Nathaniel Pownoll.

**FLETCHER, JOHN (1579-1625)**. See **BEAUMONT AND FLETCHER**.

**FLETCHER, PHINEAS**, English poet, and brother of Giles Fletcher, the younger, was the eldest son of Dr. Giles Fletcher. He was born at Cranbrook, in Kent, April, 1582. In 1603 he contributed verses to *Sorrow's Joys*. He was in priest's orders in 1611. In 1614 his pastoral drama of *Sicelides* was acted before the university. In 1627 he published his long poem, in Latin and English, of *Locustæ, or the Apollyonists*, a furious invective against the Jesuits. Next year appeared a fine but sensuous poem, entitled *Britain's Ida*, which was attributed on the title page to Spenser; but many critics, and particularly Dr. A. B. Grosart, consider it to be the work of Phineas Fletcher. The drama of *Sicelides* was printed in 1631. In 1632 he brought out a theological treatise in prose, entitled *Joy in Tribulation*, and, in 1633, his *magnum opus*, the famous poem of *The Purple Island*. His *Piscatory Eclogues* and *Miscellaneous Poems* appeared on the same occasion. It is believed that in 1650 he was ejected from his living, but nothing is known of the date or circumstance of his death.

**FLEURANGES, ROBERT (III.) DE LA MARCK, SEIGNEUR DE**, marshal of France, historian, was born of ancient family at Sedan in 1491. A fondness for military exercises displayed itself in his earliest years, and at the age of ten he was sent to the court of Louis XII., and placed in charge of the count of Angoulême, afterward King Francis I. In his twentieth year he married a niece of the Cardinal d'Amboise, but after three months he quitted his home to join the French army in the Milanese. In 1512, the French being driven from Italy, Fleuranges was sent into Flanders to levy a



body of 10,000 men, in command of which, under his father, he returned to Italy in 1513, seized Alexandria, and vigorously assailed Novara. But the French were defeated, and Fleuranges narrowly escaped with his life, having received more than forty wounds. He was rescued by his father and sent to Vercellæ, and thence to Lyons. Returning to Italy with Francis I. in 1515, he distinguished himself in various affairs, and especially at Marignano, where he had a horse shot under him, and contributed so powerfully to the victory of the French that the king knighted him with his own hand. He next took Cremona, and was there called home by the news of his father's illness. In 1519 he was sent into Germany on the difficult errand of inducing the electors to give their votes in favor of Francis I.; but in this he failed. The war in Italy being rekindled, Fleuranges accompanied the king thither, fought at Pavia (1525), and was taken prisoner with his royal master. The emperor sent him into confinement in Flanders, where he remained for some years. During this imprisonment he was created marshal of France. He employed his enforced leisure in writing his *Histoire des choses mémorables advenues du règne de Louis XII. et de François I., depuis 1499, jusqu'en l'an 1521*. In this work he designates himself *Jeune Adventueux*. Within a small compass he gives many curious and interesting details of the time, writing only of what he had seen, and in a very simple but vivid style. The last occasion on which Fleuranges was engaged in active service was at the defense of Peronne, besieged by the count of Nassau in 1536. In the following year he heard of his father's death, and set out from Amboise for his estate of La Marck; but he was seized with illness at Longjumeau, and died there in December, 1537.

FLEUR-DE-LIS, an heraldic device. Concerning its origin the most diverse theories have been broached. According to an old tradition, it was first employed as an armorial bearing by Clovis I., and represents the lily presented by an angel to the monarch at his baptism, the three fleurs-de-lis of his shield being the sign of the Trinity. Newton considers it to be the figure of a reed or flag in blossom, used instead of a scepter at the proclamation of the Frankish kings. In the opinion of Chifflet, the device was first adopted by Louis VII. of France, surnamed le Jeune, in allusion to his name Louis Floras. Some, again, have held that it is the extremity of the *francisque*, a kind of javelin anciently used in France. An objection fatal to the above and other theories assigning to the fleur-de-lis a purely French origin is that it was early an ornament of the scepters, seals, and robes, not only of the Merovingian, but of Greek, Roman, German, Spanish, and English kings, and was a symbol employed by many noble families in various parts of Europe in the twelfth and thirteenth centuries. It is stated to occur, very perfectly sculptured, in the head-dresses of Egyptian sphinxes. Gioja of Amalphi is said by Moreri to have marked the north end of the needle of the mariner's compass with a fleur-de-lis in honor of the king of Naples; but see COMPASS. Since the twelfth century the fleur-de-lis, or "flower-de-luce" (Shakespeare), has been employed as the symbol of royalty in France.

FLEURY, ANDRÉ HERCULE DE, cardinal, the celebrated minister of Louis XV. of France, was born in 1653 at Lodève, in Languedoc. He was educated by the Jesuits at Paris, and became successively almoner to Marie Thérèse, queen of Louis XIV., in 1698 bishop of Fréjus, and in 1715 preceptor to the young prince, who afterward succeeded to the throne as Louis XV. On the death of the regent Orleans in 1723, Fleury advised his royal pupil to choose the duke of Bourbon as minister, and was himself made a member of the coun-

cil. In 1726, being then in his seventy-third year, he received a cardinal's hat, and was called to the office of prime minister, which he held till his death in 1743. At the time when Fleury was intrusted with the direction of affairs, the condition of France was truly deplorable. The nation was impoverished and worn out, and the exchequer emptied by long wars of the Grand Monarque and the extravagances of the regent. Commerce was annihilated, public credit ruined, the government held in contempt, and the church distracted by internal dissensions. Fleury immediately set himself to the task, and effected important reforms. Though he was a confirmed friend to peaceful measures, he was twice driven by court intrigues to take part in foreign wars—first in the case of Stanislaus Leczinsky, the dethroned king of Poland, whose daughter Louis XV. had married; and afterward in that of the Austrian Succession, of which he did not live to see the end. In these wars, his economy, which bordered on avarice, was fatal to the cause espoused by France. The navy, neglected for fear of the expense, was no longer equal to any emergency. The Polish war he had energy neither to avert nor to carry on effectively. The meanly equipped expedition which he sent to the coasts of Pomerania could not but fail, notwithstanding the heroism displayed at Dantzic by the count of Plélo and his 1,500 soldiers. One of the most useful acts of Fleury's administration was the completion of the Royal (now the National) Library, which he enriched with many valuable manuscripts, chiefly in the Oriental languages. He was a scholar of considerable attainments. The French Academy elected him as a member in 1717, the Academy of Sciences followed this example in 1721, and the Academy of the Inscriptions et Belles-Lettres in 1725. He was also provisor of Sorbonne, and superior of the college of Navarre.

FLEURY, CLAUDE, the famous ecclesiastical historian, was born at Paris, December 6, 1640. He had already been some time in holy orders, when Louis XIV., in 1672, selected him as tutor of the princess of Conti; and so well did he acquit himself in this office, that the king intrusted to him afterward the education of the count of Vermandois, one of his natural sons; and at the death of the young prince, Fleury received as recompense for his services the abbey of Loc-Dieu, in the diocese of Rhodéz. Five years after this (1689) he was appointed sub-preceptor of the dukes of Burgundy, of Anjou, and of Berri. He thus became intimately associated with Fénelon, the chief preceptor of his royal pupils. In 1696 he was selected to fill the place of La Bruyère in the French Academy; and on the completion of the education of the young princes, the king bestowed upon him the rich priory of Argenteuil, in the diocese of Paris (1706). On assuming this benefice he resigned that of the abbey of Loc-Dieu, thus setting an example of rare disinterestedness. It was about this time that he decided, according to the suggestions of his friends, on commencing his great work, for which he had been collecting materials for thirty years—*Histoire Ecclésiastique*. Hitherto France did not possess any work of equal merit in this department of literature. There existed many works more or less voluminous on matters of doctrine and discipline; but no one had written a history of the church,—a complete and scientific exposition of the progress of Christian society, of its organization and its primitive doctrine, of its varied changes in connection with the state, of the successive development of its institutions, of all the modifications introduced into its symbols and its rites. Fleury had evidently the intention of writing a history of the church for all classes of society; but at the time in which his great work appeared it was less religion



than theology that absorbed the attention of the clergy and the educated public; and his work, as well as all those that had been published previously, is therefore more a work for the student than one for the people, dwelling, as it does, very particularly on questions of doctrine, of discipline, of supremacy, and of rivalry between the priesthood and the imperial power, while it notices very slightly general questions affecting religion and morality. This fault, which has been looked upon as a merit, secured to the *Histoire Ecclésiastique* a very great success. He died in 1723.

**FLIGHT, FLYING MACHINES.** Of the many scientific problems of modern times, there are few possessing a wider or more enduring interest than that of aerial navigation. To fly has always been an object of ambition with man; nor will this occasion surprise when we remember the marvelous freedom enjoyed by volant as compared with non-volant animals. The traditions of Dædalus and Icarus illustrate the attempts in the past; and at the present day societies exist in Britain, France, Austria, and other countries, for the purpose of solving, if possible, the knotty problem. These societies embrace men of the highest scientific attainments, and as they evince great activity, and publish their proceedings at regular intervals, it is not too much to expect that the problem of artificial flight will be actually solved, or at least much simplified. For the first time in the history of the world, the subject of aerial navigation has been taken up in earnest by practical men with the necessary degree of preliminary knowledge and training. Investigators no longer dream about flight; they experiment upon and work toward it. It is, they maintain, a physical problem to be solved by mechanical skill and ingenuity. But while writing thus hopefully, it is necessary to state that as yet no one has succeeded in constructing a fully equipped flying machine. The number of successful flying models, however, is so considerable as to inspire the cultivators of aeronautical science with a very confident hope of success.

The subject of aërostation is admitted on all hands to be one of extreme difficulty. To tread upon the air (and this is what is really meant) is, at first sight, in the highest degree utopian; and yet there are thousands of living creatures which actually accomplish this feat. These creatures, however varied in form and structure, all fly according to one and the same principle; and this is a significant fact, as it tends to show that the air must be attacked in a particular way to insure flight. The flying machine of the future, there can be no doubt, will be constructed on the type of flying animals — the insect, bird, and bat.

Flying animals, it may be premised, differ entirely from sailing ships and from balloons, with which they are not unfrequently though erroneously compared; and a flying machine constructed upon proper principles can have nothing in common with either of those creations. The ship floats upon water and the balloon upon air; but the ship differs from the balloon, and the ship and the balloon differ from the flying creature and the flying machine. The water and air, moreover, have characteristics of their own. The analogies which connect the water with the air, the ship with the balloon, and the ship and the balloon with the flying creature and flying machine are false analogies. A sailing ship is supported by the water, and requires merely to be propelled; a flying creature and a flying machine constructed on the living type require to be both supported and propelled. This arises from the fact that water is much denser than air, and because water supports on its surface substances which fall through air.

While water and air are both to be regarded as fluid

media, they are to be distinguished from each other in the following particulars. Water is comparatively very heavy, inelastic, and incompressible; air, on the other hand, is comparatively very light, elastic, and compressible. If water be struck with violence, the recoil obtained is great when compared with the recoil obtained from air similarly treated. In water we get a maximum recoil with a minimum of displacement; in air, on the contrary, we obtain a minimum recoil with a maximum of displacement.

It has been asserted, and with some degree of plausibility, that a fish lighter than the water might swim, and that a bird lighter than the air might fly; it ought, however, to be borne in mind that, in point of fact, a fish lighter than the water could not hold its own if the water were in the least perturbed, and that a bird lighter than the air would be swept into space by even a moderate breeze without hope of return. Weight and power are always associated in living animals, and the fact that living animals are made heavier than the medium they are to navigate may be regarded as a conclusive argument in favor of weight being necessary alike to the swimming of the fish and the flying of the bird. It may be stated once for all that flying creatures are for the most part as heavy, bulk for bulk, as other animals, and that flight in every instance is the product, not of superior levity, but of *weight* and *power* directed upon properly constructed flying organs.

This fact is important as bearing on the construction of flying machines. It shows that a flying machine need not necessarily be a light, airy structure exposing an immoderate amount of surface. On the contrary, it favors the belief that it should be a compact and moderately heavy and powerful structure, which trusts for elevation and propulsion entirely to its flying appliances — whether actively moving wings, or screws, or aëroplanes wedged forward by screws. It should attack and subdue the air, and never give the air an opportunity of attacking or subduing it. It should smite the air intelligently and as a master, and its vigorous, well-directed thrusts should in every instance elicit an upward and forward recoil. The flying machine of the future, there is reason to believe, will be a veritable example of "*multum in parvo*." It will launch itself in the ocean of air, and will extract from that air, by means of its traveling surfaces — however fashioned and however applied — the recoil or resistance necessary to elevate and carry it forward. Extensive inert surfaces indeed are contraindicated in a flying machine, as they approximate it to the balloon, which cannot maintain its position in the air if there are air currents. A flying machine which could not face air currents would necessarily be a failure. To obviate this difficulty we are forced to fall back upon *weight*, or rather the structures and appliances which weight represents. These appliances should not be unnecessarily expanded, but when expanded they should, wherever practicable, be converted into actively moving flying surfaces, in preference to fixed or inert dead surfaces.

FLINCK, GOVERT, born at Cleves in 1615, was apprenticed by his father to a silk mercer, but having secretly acquired a passion for drawing, was sent to Leuwarden, where he boarded in the house of Lambert Jacobszon, a Mennonite, better known as an itinerant preacher than as a painter. For many years Flinck labored on the lines of Rembrandt, following that master's style in all the works which he executed between 1636 and 1648; then he fell into peculiar mannerisms by imitating the swelling forms and grand action of Rubens' creations.

The earliest of Flinck's authentic pieces is a likeness of a lady, dated 1636, in the gallery of Brunswick. His



first subject picture is the *Blessing of Jacob*, in the Amsterdam museum (1638). Both are thoroughly Rembrandtesque in effect as well as in vigor of touch and warmth of flesh tints. The four "civic guards" of 1642, and "the twelve musketeers," with their president in an arm-chair (1648), in the town-hall at Amsterdam, are fine specimens of composed portrait groups.

But the best of Flinck's productions in this style is the *Peace of Munster*, in the museum of Amsterdam, a canvas with nineteen life-size figures full of animation in the faces, "radiant with Rembrandtesque color," and admirably distributed. Flinck here painted his own likeness to the left in a doorway. The chronology of Flinck's works, so far as they are seen in public galleries, comprises, in addition to the foregoing, the *Grey Beard* of 1639 at Dresden, the *Girl* of 1641 at the Louvre, a portrait group of a male and female (1646) at Rotterdam, a lady (1651) at Berlin. In November, 1659, the burgomaster of Amsterdam contracted with Flinck for twelve canvases to represent four heroic figures of David and Samson and Marcus Curius and Horatius Cocles, and scenes from the wars of the Batavians and Romans. Of several pictures which were painted for the Great Kurfürst, none are preserved except the *Expulsion of Hagar*, in the Berlin museum. Flinck's death at Amsterdam, February 22, 1660, was sudden and unexpected.

FLINDERS, MATTHEW, English navigator, explorer, and man of science, was born at Donington, near Boston, in Lincolnshire, March 16, 1774. After a voyage to the Friendly Islands and West Indies, and after serving in the *Bellerophon* during Lord Howe's "glorious first of June" (1794) off Ushant, Flinders went out in 1795 as midshipman in the *Reliance* to New South Wales. For the next few years he devoted himself to the task of accurately laying down the outline and bearings of the Australian coast, and he did his work so thoroughly that he left comparatively little for his successors to do. With his friend George Bass, the surgeon of the *Reliance*, in the year of his arrival he explored George's River; and, after a voyage to Norfolk Island, again in March, 1796, the two friends in the same boat, the *Tom Thumb*, only eight feet long, and with only a boy to help them, explored a stretch of coast to the south of Port Jackson. After a voyage to the Cape of Good Hope, when he was promoted to a lieutenantcy, Flinders was engaged during February 1798 in a survey of the Furneaux Islands, lying to the north of Tasmania. His delight was great when, in September of the same year, he was commissioned along with Bass, who had already explored the sea between Tasmania and the south coast to some extent and inferred that it was a strait, to proceed in the sloop *Norfolk* (twenty-five tons) to prove conclusively that Van Diemen's Land was an island by circumnavigating it. In the same sloop, in the summer of next year, Flinders made an exploration to the north of Port Jackson, the object being mainly to survey Glasshouse Bay (Morton Bay) and Hervey's Bay. Returning to England he was appointed to the command of an expedition for the thorough exploration of the coasts of Terra Australis, as the southern continent was still called, though Flinders is said to be the first to suggest for it the name Australia. On July 18, 1801, the sloop *Investigator*, in which the expedition sailed, left Spithead, Flinders being furnished with instructions and with a passport from the French Government to all their officials in the Eastern seas. On April 8, 1802, shortly after leaving Kangaroo Islands, at the mouth of St. Vincent Gulf, Flinders fell in with the French exploring ship, *Le Géographe*, under Captain Nicolas Baudin, in the bay now known as Encounter Bay. In the narrative of the French expedition pub-

lished in 1807 (when Flinders was a prisoner in the Mauritius) by M. Peron, the naturalist to the expedition, much of the land west of the point of meeting was claimed as having been discovered by Baudin, and French names were extensively substituted for the English ones given by Flinders. It was only in 1814, when Flinders published his own narrative, that the real state of the case was fully exposed. Flinders continued his examination of the coast along Bass' Strait. Flinders completed the survey of the Gulf of Carpentaria, and after touching at the island of Timor, the *Investigator* sailed round the west and south of Australia, and Port Jackson was reached on June 9, 1803.

After detention in France he reached England in 1810. The official red-tapeism barred all promotion to the unfortunate explorer, who set himself to prepare an account of his explorations, though unfortunately an important part of his record had been retained by De Caen. The results of his labors were published in two large quarto volumes, entitled, *A Voyage to Terra Australis*, with a folio volume of maps. The very day (July 19, 1814), on which his work was published Flinders died, at the early age of forty.

FLINT is a calcedonic variety of silica found in the form of irregular concretionary nodules of varying size, chiefly in the Upper Chalk beds. The mode in which flint originated is not satisfactorily explained.

FLINT, a maritime county of North Wales, bounded on the northeast by the river Dee, on the east by Cheshire, on the south and west by Denbighshire, and on the north by the Irish Sea. The main portion of the county is twenty-six miles long by ten to twelve broad, and the detached hundred of Maelor, lying eight miles southeast of the main part, measures nine miles by five. Flintshire is the smallest of the Welsh counties, its area being 289 square miles. The coast is low and sandy, but along the Dee estuary is fertile. The county is bisected by a low range of hills, stretching almost due north. The geological basis consists of rocks of the Carboniferous series. Coal, iron, lead, copper, calamine, zinc, and limestone are the chief mineral products. Some chemical works and potteries of coarse clay give employment. There are numerous well-watered and picturesque valleys, the soil of which is for the most part fertile and well cultivated. The uplands afford good pasturage. The Dee in the east and the Clwyd in the west of the county are the principal rivers. The Chester and Holyhead railway skirts the east and north shores. Population (1801), 39,469; (1841) 66,919; (1890) 83,000. Flintshire returns one member to parliament; its county council consists of fifty-six members. The chief towns are Flint, Mold, St. Asaph, Holywell, and Hawarden. Flintshire has traces of Roman lead mines, and is traversed by Watt's and Offa's dykes. In the seventh century Saxon invaders massacred all the Christian monks of the monastery of Bangoriscoed.

FLINT, a railroad, telegraph and banking town of Genesee county, Mich., of which it is the county-seat, is situated on the Grand Trunk and Flint & Pere Marquette railroads, and is an extensive lumber market and a town of some manufacturing importance. The city contains the State Institution for the deaf, dumb and blind; a high school building, costing \$150,000; a court-house and city hall, twelve churches, two national banks and one savings bank, and five newspaper offices. Lumber is the chief article of export. The census of 1890 showed a population of 9,845.

FLINT, TIMOTHY, an American clergyman and



writer, was born in Reading, Massachusetts, July 11, 1780. He graduated at Harvard College in the close of 1800. Settled as a Congregational minister in Lunenburg, Massachusetts, he pursued scientific studies with interest; and his labors in his laboratory seemed so strange to the people of that retired region, that some persons supposed and asserted that he was engaged in counterfeiting. This led to disagreeable complications, which resulted in his leaving his parish and becoming a missionary in the valley of the Mississippi. There could have been no discipline better adapted to correct his natural sensitiveness than his work at the West in those days, where he came into contact with many rough people and peculiar social habits. His observations on the manners and character of the settlers of the Ohio and Mississippi valleys were recorded in a very picturesque work called *Recollections of Ten Years Passed in the Valley of the Mississippi*, Boston, 1826. This book passed to a second edition, and excited so much interest as to be translated into French as well as reprinted in England. Indeed, it was the first account of the Western States of America which brought to light the real life and character of the people. Flint had acquired this knowledge of the young communities of the West, not only by his journeys among them as an itinerant preacher, but also by having been for a short period teacher and farmer on the banks of the Mississippi and Red rivers. The success which this work met with, together with the failing health of the writer, led him to relinquish his more active labor for literary pursuits. His subsequent publications were as follows:—*Francis Barrian, or the Mexican Patriot*, 1826,—a novel, the scene of which is laid in Mexico at the period of revolution in which Iturbide was overthrown; *A Condensed Geography and History of the Western States in the Mississippi Valley*, 2 vols. 8vo. Cincin., 1828; *Arthur Clenning*, a novel, 1828; *George Mason, the Young Backwoodsman*, a novel; *Indian Wars in the West*, 1833; *Memoir of Daniel Boone*, 1834. In addition to these works, Flint published several translations from the French, and essays in the London *Athenæum*, the *Western Review*, and the *New York Knickerbocker*, of which last two magazines he was at different times editor. His style was vivid, plain and forcible, and his matter interesting; the spirit of his writings was always humane and genial; the *Quarterly Review*, in a notice of his first book, says: "These pages reflect a sincere, humane and liberal character, a warm and gentle heart, and hardly even a prejudice which is not amiable." He was very industrious, and had acquired such a power of abstraction that he prosecuted the labor of translating the *Bio-graphie Universelle* in a room where other persons were engaged in work or conversation, being so absorbed in his work as to lose all consciousness of where he was or who was present. He died in Salem, August 16, 1840.

FLODOARD, or FRODOART, a French chronicler, was born at Epernay in 894. He was educated at Rheims, and for some time held the office of canon in the cathedral of that city. The later years of his life were spent in retirement at a neighboring monastery, and were devoted to study and the exercises of piety. He died March 28, 966. His works are the most important contribution to the French literature of his time.

FLOOD. See DELUGE.

FLOOD, HENRY, an eminent Irish orator and politician, born in 1732, was the son of the Right Honorable Warden Flood, chief-justice of the Queen's Bench in Ireland. At the age of fifteen he was sent to Trinity College, Dublin; and he subsequently studied at Oxford under Markham, afterward archbishop of York.

On leaving the university with a good reputation for classical scholarship, he proceeded to the Temple. Possessing a competent fortune, high social position, and considerable family influence, he determined to devote himself to a political life, and obtained a seat in the Irish House of Commons for his own county of Kilkenny. His abilities soon placed him in the position of a leader of the opposition or popular party, to which he rendered good service on several occasions. Though somewhat too solemn and dignified, Flood was an orator of considerable power, and especially master of that unsparing invective which was then one of the best employed weapons of debate, and which often degenerated into what would now be considered unwarrantable personalities. At that time, indeed, political rivalry frequently ended in personal hatred.

In 1796 Flood had the misfortune to be involved in an election quarrel with a Mr. Agar. The result was a duel, and on the second exchange of shots Agar was mortally wounded. Flood was brought to trial, but acquitted. In 1775 Flood was persuaded to an act which seriously diminished his influence. He accepted the office of vice-treasurer under Lord Harcourt and the duke of Buckingham. But in 1780, in consequence of his strong sympathy with the cause of Irish independence and his position as lieutenant-colonel of the Irish volunteers, he felt obliged to resign his office, and in consequence he was removed by the government from the council, treatment which he bitterly resented. His influence was now entirely devoted to the support of the popular party, which, in fact, he had never deserted. He was present at the great armed convention of the volunteers which met at Dungannon, and proposed a resolution that the powers exercised by the privy council were unconstitutional. After the passing of the Irish Bill of Right through the splendid efforts of Grattan, Flood made an attempt to achieve what he considered would be a still greater triumph. He declared that the mere repeal of the act (6 Geo. I.) which had subjected Ireland to the control of the English parliament was not enough, and insisted upon an express renouncement of the right of the English parliament to interfere in any way with the government of Ireland. Grattan, maintaining that his own measure was sufficient, vigorously opposed the bill which Flood introduced; and the two orators, forgetting their old friendship, exchanged speeches full of the bitterest personal invective. The quarrel was about to end in a duel, and arrangements were actually being made for a meeting, when the affair was discovered, and both were bound over to keep the peace. Flood's bill was completely defeated, for it was altogether unnecessary, and could only have served as a triumph to Irish national vanity. In 1783 Flood obtained a seat in the English House of Commons (while retaining his seat in the Irish House), being elected M.P. for Winchester. He was afterward (1785) member for Seaford. But his success was not such as he had enjoyed in Ireland, and his career in the English parliament was not of much importance. Perhaps his greatest effort was his speech against Pitt's famous commercial treaty. Flood died on December 2, 1791.

FLOOR CLOTH is a covering for the floors of lobbies, halls, passages, and other situations where there is much traffic and heavy wear. Originally floor-cloth consisted of a heavy canvas coated with painters' colors and ornamented with patterns executed with the brush. At a later period stenciled ornaments took the place of hand-painted patterns, and now ornamental designs are applied solely by means of hand-blocks.

FLOR, ROGER DI, a military adventurer who, in the early years of the fourteenth century, distinguished himself as leader of the Catalan Grand Company. He was



the second son of a falconer in the service of the emperor Frederick II., and when eight years old was sent to sea in a galley belonging to the Knights Templar. He entered the order, and became commander of a galley. At the siege of Acre by the Saracens in 1291 he absented himself, took no part in the defense of the town, and was accused of appropriating to his own use the treasures of his order. He was denounced to the pope by the grand master as a thief and an apostate, was degraded from his rank, and threatened with arrest. To escape imprisonment he fled to Genoa, where he began to play the pirate. The struggle between the kings of Aragon and the French kings of Naples for the possession of Sicily was at this time going on; and Roger entered the service of Frederick, king of Sicily, who gave him the rank of vice-admiral. At the close of the war, in 1302, Frederick being anxious to free the island from the auxiliaries whom he had no longer the means of paying, Roger induced his followers to seek new adventures in the East, in fighting against the Turks, who were ravaging the empire. The emperor Andronicus II. accepted his offer of service; and in September, 1303, Roger with his fleet and army arrived at Constantinople. He was adopted into the imperial family, was married to a granddaughter of the emperor, and was made grand duke and commander-in-chief of the army and the fleet. After some weeks lost in dissipation, intrigues and bloody quarrels, Roger and his men were sent into Asia, and after some successful encounters with the Turks, they went into winter quarters at Cyzicus. In May, 1304, they again took the field, and rendered the important service of relieving Philadelphia, then invested and reduced to extremities by the Turks. But Roger, bent on advancing his own interests rather than those of the emperor, determined to found in the East a principality for himself. He sent his treasures to Magnesia, but the people slew his Catalans and seized the treasures. He then formed the siege of the town, but his attacks were repulsed, and he was compelled to raise the siege. Passing over into Europe, he settled his troops in Gallipoli and other towns, and visited Constantinople to demand pay for the Grand Company. Dissatisfied with the small sum granted by the emperor, he plundered the country and carried on intrigues both with and against the emperor. In the spring of 1306 Roger was created Cæsar, this being the first time that the title was given to a mere adventurer. Before setting out on a second expedition to Philadelphia, he visited the young emperor Michael at Adrianople; and there he was assassinated and his Catalan cavalry were massacred, April 4, 1306. His death was avenged by a war which was fiercely waged by the Grand Company against the Greeks.

FLORA, in Roman mythology, a goddess of spring-time and flowers, to whom for her fostering influence a festival (*Floralia*) of great gayety and perhaps excessive license was held in Rome, at first irregularly, but after 173 B.C. annually, with increasing popularity. This festival was extended to five days, April 28th to May 3d, the date of April 28th answering to the foundation day of the temple of Flora near the Circus Maximus. To her worship was attached a Flamen Floralis.

FLORENCE (Italian *Firenze*, ancient *Florentia*), the capital of Tuscany, now a province of the kingdom of Italy, is an archiepiscopal see. It is situated 125 miles north of Rome, on both sides of the river Arno, which here flows through a wide valley, bounded by spurs of the Apennine range to the north, and by lower hills to the south of the city. The bed of the river at Florence is 138 feet above the Mediterranean.

The soil is remarkably fertile; corn, vines, and olives cover hill and valley, while the mountains, which rise above 3,000 feet, have the cypress, ilex, chestnut,

and pine. The country is celebrated for the abundance of its flowers, and presents a rich field for the botanist.

The climate of Florence is extremely variable, especially in the early spring, when the inhabitants are liable to diseases of the trachea, to bronchitis, and affections of the lungs. The summers are hot; but both the summers and autumns are peculiarly healthy, when the city is entirely free from intermittent fever, while typhoid fever is of rare occurrence. Eruptive diseases and all children's complaints are exceedingly mild.

The population of Florence is very fluctuating. In 1854 the inhabitants numbered 115,675, but during the short period when it was the capital of the new kingdom there was a large increase of Italians as well as foreigners; this diminished as rapidly on the transference of the capital to Rome. By the census taken December 31, 1871, the total population, foreigners included, amounted to 167,093. On December 30, 1888, the number had risen to 178,342.

The Florentines are gentle and courteous in their manners, though retaining the republican feeling of equality, and are well disposed toward all who treat them with kindness and respect. They are justly proud of the traditions of their native city, but are hardly conscious that centuries of misgovernment have left them behind in the race of civilization. Though the advantages of a liberal education are now open to them, and they are remarkably rapid in acquisition, the more important moral training is still wanting,—a defect which, with the absence of chivalrous respect for women, renders men of all classes, as is too much the case also in other parts of Italy, tyrannical to their wives and children, as well as indifferent to the sufferings of the lower animals, all alike being regarded as property, over which they have an absolute control.

Florence was originally a small trading village belonging to the Etruscan city of Fiesole, whence merchandise was sent down the Arno to Pisa, then a seaport. When colonized by the soldiers of Sulla, it gradually attained the dignity of a city, with the rank and privileges of a municipium. The name Florence may have been derived from Florinus, a Roman general, or from *Fluentia*, because situated at the confluence of the Arno and Mugnone, or from the profusion of flowers growing in the vicinity. In the reign of Tiberius Cæsar the Florentines sent an embassy to Rome to deprecate a decree of the Roman senate, by which, in order to check the inundations caused by the number of tributary streams flowing into the Tiber, it had been proposed to turn the Chiano into the Arno. Christianity was first introduced in 313 A.D., and the most celebrated of Early Florentine bishops was Zanobius, who died in 417, and to whom various miracles are ascribed. During his lifetime an invading army of barbarians approached Florence, but were defeated and destroyed in the fastnesses near Fiesole by the Roman general Stilicho. The Florentines, however, attributed the preservation of their city to the prayers of Zanobius. The victory was won in 405 on October 8th, a day dedicated to a youthful saint, Reparata, who is said to have appeared in the midst of the battle, bearing in her hand a blood-red banner with the device of the white lily, which from that time became the badge of the city, while a new cathedral, built on the site of the old church of San Salvador, received her name. Florence had suffered the fate of other Italian cities at the hands of northern invaders, when Charlemagne, on his way to Rome, rebuilt its walls. Commerce began to flourish in the tenth century, when as yet German nobles or their descendants, who held their castles in fief of the German emperors, dwelt beyond the city. The Pope, because an Italian sovereign,



was regarded as the representative of national independence, and when Tuscany fell to the inheritance of the Countess Matilda, the Florentines found in her a patriotic champion of their rights, as well as a staunch adherent of the reigning pope, Gregory VII. A second circle of walls was built as a protection against the imperialists, and Matilda obliged some of the powerful nobles in the neighborhood to yield their lands to the canons of Sta. Reparata.

About 1240 the Paterini, a sect of Reformers after the manner of the Albigenses in France, had gained considerably in numbers and influence, especially among the imperialists, who about this time assumed the name of Ghibellines. Their adversaries, the Guelphic or papal party, called in Peter Martyr, a Dominican friar of Verona, to rouse the multitude for the destruction of this heresy. Two columns in Florence still mark the spots where the Paterini were massacred. A few years later the Guelphic Florentines sustained a severe defeat from Manfred, a natural son of the emperor Frederick II., at Monteaperti near Siena, and the Ghibellines, whom they had banished, re-entered Florence. The Ghibelline conquerors proposed to level the city with the ground, but were deterred by the bold and determined opposition of one of their own party, Farinata degli Uberti, whose name has been immortalized by Dante. About this time a French pope, Clement IV., invited Charles of Anjou, brother of Louis IX. of France, to take possession of Naples and drive the imperialists from Italy; and after the defeat and death of Manfred at Benevento, Charles complied with the request of the Florentine Guelphs, to assume the lordship of their city. In 1282, however, the wealthier guilds of Florence established a form of government or signory of their own, consisting of members chosen among themselves with the title of priors. Not satisfied with having driven their Ghibelline rivals into banishment, they sent an army to encounter them at Campaldino, where the Ghibellines were defeated with great slaughter. To arrest the power of the nobles within the city, a new code was framed in 1293, which went so far as to exclude them from their rights as citizens, and an officer was appointed — gonfaloniere di giustizia (standard-bearer of justice) — with a guard of soldiers to enforce the laws. Seventy-two families were declared incapable of holding office, and as they naturally combined in self-defense, peace seemed as far removed as ever from the walls of Florence.

With the commencement of the fourteenth century the parties which contended for power in Florence had assumed new names. On one side were the Bianchi, including the remnant of the old Ghibelline faction, but now representing the popular party; on the other, the Neri or Guelphs, who, under their leader, Corso Donati, represented the nobles or aristocracy of the city. Each party as it gained the ascendancy sent its opponents into exile, until Pope Boniface VIII. again resorted to the fatal expedient of sending for a French prince, Charles of Valois, to restore order, and establish papal supremacy in the peninsula. When Charles arrived in Florence, he gave full license to the Neri to pillage the city and avenge their wrongs. The signory endeavored to conciliate him by bribes, a measure to which Dante, then a prior, refused his consent, thus leading to his own banishment. A few years later the emperor Henry of Luxembourg descended into Italy, and the Florentines, whilst boldly preparing to resist his pretensions, added a third circuit of walls to their city. His death, in 1313, put an end to this danger.

In a war with Castruccio Castracani, the tyrant of Lucca and Pisa, the Florentines sought the assistance of Robert, king of Naples, the son of Charles of Valois;

but soon becoming jealous of the foreign power they had themselves invited, they created a new officer of justice, called the Bargello or head of police, who exercised his authority with so much cruelty that for a few months Florence was subjected to a reign of terror. During another war with Lucca, the Florentines again applied to Robert of Naples, who sent them his son, the duke of Calabria. He was accompanied by Walter de Brienne, duke of Athens, who, acting as lieutenant for the young prince, set aside the government of the priors, and ruled Florence with a rod of iron. The people could not long endure his acts of savage cruelty, and drove him from their city, after having put his minions to death in a manner so barbarous as to rival the deeds of the tyrant they had expelled. Tumults, a famine, and lastly the plague, devastated the land; and as a culmination of disasters, the mercenary troops employed everywhere in Italy roamed over the country and spread desolation wherever they came.

In 1378 occurred the famous rebellion of the Ciompi (Wooden Shoes), in which the artisans of Florence, led by a wool-carder, Michele di Lando, gained possession of the Palazzo Vecchio, and turned out the signory. Lando proved himself a man of sense and courage; he finally quelled the riot in which he had been engaged but had not roused, and restored the authority of the government. It was about this period that Salvestro de' Medici, Bettino Ricasoli, and Gino Capponi were among the leading men of the republic. From the riot of the Ciompi to the year 1390 Florence enjoyed the rare blessing of peace. This was broken by the ambitious thirst for universal dominion of Gian Galeazzo Visconti, lord of Milan; and Florence owed her preservation to her general, Sir John Hawkwood, an Essex tailor, who had joined the mercenary bands on the Continent, and earned himself wealth and celebrity as one of the greatest commanders of the age. The death of Gian Galeazzo in 1402 terminated the war. In 1406 the Florentines gained possession of their ancient rival Pisa after a long and cruel siege. The fall of Pisa put an end to the power of the Ghibelline or feudal party in Tuscany. In 1414, at the council of Constance, Pope John XXIII. was deposed, and came to reside in Florence, where his monument in the baptistry is one of the finest works of Donatello.

The wealth of the city was meantime always increasing, and manufactures of silk and woolen articles flourished within her walls. The richest of her citizens, Giovanni de' Medici, was chosen gonfalonier in 1426, but the popularity of this family had begun to excite the apprehension of all true patriots. When Giovanni introduced the "catasta," or inquiry into the possessions of every citizen, with a view to taxation according to their means — a measure favorably viewed by the lower orders — it raised loud opposition on the part of the wealthy; for, however great their riches, none could compete with the Medici, and they saw in the "catasta" another stepping stone to raise their rival to greater power and authority. At Giovanni's death his popularity descended to his eldest son Cosimo, who lived to be called (however undeservedly) the father of his country. From him descended Lorenzo the Magnificent, Popes Leo X. and Clement VII., Catherine de' Medici queen of Henry II. of France, and Alexander, the first duke of Florence. From Giovanni's younger son, Lorenzo, descended the grand-dukes from Cosimo I. to Gian Gastone. Cosimo de' Medici and Rinaldo dei Albizzi represented the two great families who aspired to rule Florence. The Albizzi for a short time gained the ascendancy, and Cosimo was sent into exile. Before a year he was recalled, and was created gonfalonier, and the Albizzi were banished.



In 1441 an œcumenical council was held in Florence by Pope Eugenius IV., to settle the claims of the Latin and Greek Churches, when learned men arrived from the East, and introduced the study of Greek classical authors. Neri Capponi alone ventured to oppose the ambition of the Medici, and it was said of him that, if Cosimo was the wealthiest man, Neri was the wisest in Florence; but the death of Capponi in 1457 left the Medici without a rival. The death of Cosimo's favorite son, Giovanni, in 1463, cast a gloom over the few remaining months of his own life, for his surviving son, Pietro, was a man enfeebled by disease. At the death of Pietro in 1469, his young son, Lorenzo, relates how the principal men of the city and of the state came to their house to condole with them on their loss, and to encourage him to take on himself the care of the city and government, as his grandfather and father had done. In 1470 Lorenzo was created syndic, and the next year he entertained, with the utmost magnificence, Galeazzo Sforza, duke of Milan. In 1472 Volterra was added to the Florentine dominions. Such horrible atrocities were committed during the siege and sack of this city, that the crime lay heavy on Lorenzo's conscience in his dying hour. In the Pazzi conspiracy of 1478 Lorenzo narrowly escaped with his life, while his brother Giovanni was murdered before the altar of the cathedral. The conspirators were put to death with great barbarity, and Lorenzo's popularity rose higher than ever. Surrounded by men of genius and learning whom his wealth could buy, or the charms of his manners and accomplishments could attract, Lorenzo added to the honors of his native city by reviving Greek taste and culture.

The appearance of Girolamo Savonarola, or the "Frate," as he was called in Florence, awoke a new spirit. His denunciations of the immoral lives of the citizens, and of books and works of art which tended to lower rather than exalt human nature, including the writings of Lorenzo himself, were listened to by crowded audiences. Such was his influence that even Lorenzo, when on his deathbed in 1492, sent for the "Frate" to receive his confession, and grant him absolution. That absolution Savonarola refused, unless Lorenzo repented of his usurpations, and promised to restore a free government to Florence; but to this Lorenzo would not consent, and he died unshriven. The dawn of art and literature in the thirteenth century had attained its greatest brilliancy in the fourteenth and fifteenth. Before the Medici had risen to power, the city had been embellished by the works of Andrea Orcagna, Taddeo Gaddi, Fra Filippo Lippi, Fra Angelico, Andrea Castagno, Donatello, and Desiderio di Settignano; Ghiberti had designed his *Gates of Paradise* for the baptistry; Brunelleschi had added a cupola to the cathedral; and Maso Finiguerra had led by his niello work to the discovery of copperplate engraving. It was in the fifteenth century that Bernardo Cennini introduced the art of printing into Florence. Filippino Lippi, Fra Bartolommeo and his friend Mariotto Albertinelli, Baccio d'Agnolo, Baldovinetti, Sandro Botticelli, the Ghirlandai, the Peselli, Benedetto de Rovezzano and Benedetto da Majano, Mino da Fiesole, Andrea Verocchio, and Leonardo da Vinci were the precursors, and some of them the contemporaries, of Michelangelo, the glory of his fellow citizens. With Andrea del Sarto and Raphael — who, though from Urbino, painted some of his finest works in Florence — painting reached its highest perfection. Among the men of literature were Boccaccio, Guicciardini, Macchiavelli, Poliziano, Marsilio Ficino, and Pico della Mirandola. Lorenzo's eldest son Piero succeeded to his honors; his second son, Giovanni, already a cardinal, became afterward Leo X., and his youngest son, Giuliano, duke of Nemours,

perhaps the only virtuous man among the Medici, died young.

When Charles VIII. of France was invited by Lodovico il Moro, lord of Milan, into Italy, Piero de' Medici, to conciliate the good will of the French king, visited him in his camp, and offered to yield the fortresses of Tuscany into his hands. On Piero's return to Florence he found himself condemned as a traitor, and had to escape from the city, followed by the rest of his family. Charles VIII. entered Florence in 1494, intending to restore the Medici, but the signory refused to comply with his request, and when the king, affecting to play the part of a conqueror in a vanquished city, dictated terms which he expected the Florentines to accept, Piero Capponi, one of that family of staunch republicans, tore the obnoxious paper in his presence. Charles angrily declared he would summon his troops by the call of the trumpet. "And we," replied Capponi, "will sound our bells" — the old war signal of the Florentines. Charles was forced to yield, but still lingered in Florence, until Savonarola, whose courage and sacred character appear to have overawed even this proud monarch, went to him and bade him begone. The influence of the "Frate" daily increased, as well as the number of his followers; and eager to restore a free constitution to Florence, which he believed could only exist with virtue in her citizens, he persuaded the signory to call a grand council or parliament of the people. Charles VIII. had restored independence to Pisa, but the Florentines were eager to recover possession of that city, and since Pisa was the ally of Pope Alexander VI., the Borgia of infamous memory, and the greatest enemy of Savonarola, the "Frate" sanctioned the act. Pierro Capponi perished during the course of this short war, and the Medici made a fresh attempt to re-enter Florence. The tide of popular favor was turning against Savonarola; step by step he lost ground with the people, till after a violent tumultuary attack on his convent of St. Mark in 1498, he was dragged to prison, torture, and execution.

Early in the sixteenth century Louis XII. of France having entered Italy to claim the duchy of Milan, by right of his grandmother, Valentina, a Milanese princess, Pope Julius II., who had placed himself at the head of the league to drive him from the country, insisted on the Florentines joining the enemies of the French king and recalling the Medici. Piero had met his death by accidental drowning, but his son, Lorenzo, duke of Urbino, returned to Florence, and after a short life of vicious indulgence, died in 1519, leaving an infant daughter, Catharine, afterward married to Henry II. of France. Two illegitimate scions of the family, Ippolito and Alexander, now occupied the Medici palace in Florence. Clement VII., also a Medici, who had succeeded Pope Julius, was at this time besieged in his castle of St. Angelo by the Constable Bourbon, general of the Emperor Charles V.; and in the year 1527 Rome was taken and sacked, to the consternation of all Europe, while the party in Florence hostile to the Medici alone perceived a gleam of hope in the destruction of a Medicean pope. Niccolo Capponi, a weak though amiable man, was the leader of this party, and Clarice, the sister of Lorenzo of Urbino and wife of Filippo Strozzi, one of the most unprincipled of Florentine citizens, appealed to Niccolo for aid to drive out of Florence the two youths, Ippolito and Alexander, whom she refused to accept as belonging to her family. Meantime Clement had been reconciled to the emperor, and both approached Florence with a large army. After enduring all the protracted sufferings of a siege, and after the gallant but vain attempts of the patriot Feruccio to relieve his fellow citizens, Florence fell by



treachery into the hands of the enemy; the Medici entered the city in triumph, and Alexander was created its duke (1530). Ippolito died by poison, administered, it is supposed, by his cousin Alexander, who, after a reign rendered detestable by his vices, was murdered in his bed by his cousin Lorenzino, in 1537. Cosimo de' Medici, son of Giovanni delle Bande Nere, a brave soldier and captain of mercenary troops, and descended from Lorenzo the brother of Casimo, the "father of his country," succeeded to the dukedom. The conquest of Siena added to his wealth and power; and in 1569 the pope created him grand-duke of Tuscany. Though accused of the murder of two of his sons and of a daughter, Cosimo had the force of character and ability to command fear, if not respect, from the people over whom he tyrannized. He was a patron of art, and this hereditary taste was continued in his son, the grand-duke Francis I. (1575).

The school of art founded by Michelangelo had degenerated into feeble exaggerations, without the genius of the great master. Giovanni Bologna and Benvenuto Cellini alone struck out new and original paths; and the elegance and grace of their works in bronze and marble still adorn the public places of Florence, eclipsing the clumsy productions of their contemporaries. Francis was married first to Joanna of Austria, and secondly to a beautiful Venetian lady, Bianca Capello, whose first husband was assassinated to make way for the grand-duke. Francis and Bianca died on the same day, 1587, not without suspicion of having been poisoned by his brother and successor Ferdinand, who resigned a cardinal's hat for the dukedom, and married Princess Christina of Lorraine. A double alliance was formed with France by the union in marriage of his niece Marie de' Medici, daughter of Francis, with King Henry IV. Cosimo II. succeeded Ferdinand in 1609. The day of his accession Galileo discovered the satellites of Jupiter, which, in compliment to the young sovereign, he named "Stella Medicei." (See GALILEO.)

Ferdinand II. was still a child when he ascended the throne, in 1621. He married Vittoria della Rovere, heiress of Urbino; and though her lands were claimed by the church, she brought a rich dowry to Florence. Ferdinand and his brother Cardinal Leopold added greatly to the art treasures in the galleries, and founded academies of art and science. Cosimo III., who succeeded in 1670, was a narrow-minded bigot, whose marriage with a gay young princess of the court of Louis XIV. of France ended in separation. He died in 1713, leaving one son, Gian Gastone, whose mild character, aversion to the punishment of death, and abolition of oppressive taxes made him popular with his subjects. Commerce, industry, and agriculture flourished during the reign of this last of the Medici. At his death in 1737 he left no male heirs to the throne. Tuscany had been already assigned by a European agreement—the celebrated Pragmatic Sanction—to Francis duke of Lorraine in compensation for his duchy, which had been annexed to France. In 1753 an edict gave Tuscany to the second son of France and the empress Maria Theresa; and two years later, on the death of his father, Pietro Leopold of Austria arrived in Florence to take possession of the throne. His short reign marked a new era of progress and reform. The Inquisition was abolished, privileges set aside, and plans proposed for draining and colonizing the Maremma. In 1790 Leopold was called to Vienna to succeed his brother Joseph II. as emperor, and left his younger son Ferdinand III. grand duke of Tuscany. By an article of the Pragmatic Sanction, Tuscany had been declared a separate and independent sovereignty; therefore, when, after the outburst of the French Revolution, the emperor Francis II. claimed the assistance of

a Tuscan army to restore the Bourbons in France, the great minister Fossombroni refused, declaring that Tuscany was on terms of peace and amity with the French republic. But in 1796 Ferdinand, yielding to the importunity of the court at Vienna, joined in the war against France, and two years later Florence was occupied by a French army. The first consul, Napoleon Bonaparte, conquered Tuscany, and whilst Ferdinand renounced his rights on condition of a compensation in Germany, one of the Bourbons of Parma was placed on his throne as king of Etruria. Tuscany was annexed to the French empire in 1808, but in 1809 the grand-duchy was restored in favor of Eliza Bonaparte Bacciochi, sister of the emperor Napoleon.

Her reign lasted only five years, and after Napoleon had been exiled to Elba, Ferdinand resumed his sovereignty. On this occasion an Austrian, Prince Rospigliosi, was sent to Florence to announce his arrival, and in his proclamation he declared Tuscany to be an inheritance and patrimony of the imperial house of Austria. The vain attempt of Lombardy, in 1820, to shake off the Austrian yoke, an attempt in which the crown prince of Piedmont, Carlo Alberto, was secretly implicated, ended in the incarceration of some of the noblest Italian patriots in Austrian fortresses for a period of from sixteen to twenty years. It was vain for Fossombroni to protest, and declare that the Tuscan Government did not require Austrian soldiers to play the masters; Austrian soldiers arrived to occupy Tuscany as well as the other Italian states, and the aulic counselor Menz wrote to Prince Metternich that "the Tuscan Government, led to reflect on its dangers, had assumed a firmer attitude, and constituted a more active and vigilant police, and, at all events, the respect inspired by Austrian bayonets placed at the gates of Tuscany was sufficient to dispel revolutionary ideas." Ferdinand died in 1833, and was succeeded by his son, Leopold II., who had married a Neapolitan princess. Alarmed by the revolutionary movements of 1847, Leopold, like other Italian princes, granted his people a constitution, but when they further demanded to be led against the Austrians, to assist in driving the foreigner from Italy, he reluctantly permitted the Tuscan army, chiefly consisting of young volunteers, to depart. The enthusiastic youths who fought for the independence of their country displayed unwonted valor at Curtalone and Montanara; but the grand-duke signified his displeasure by withdrawing titles and pensions from even the surgeons who attended the wounded on the field of battle. Among the liberals in Florence who had long been seeking an opportunity to shake off foreign interference in the government of their country, were men of the greatest moderation and virtue—Baron Bettino Ricasoli, the Marchese Cosimo Ridolfi, the poets Niccolini and Giusti, Salvagnoli, the Marchese Neri Corsini, and the Marchese Gino Capponi, the last of that family illustrious for virtue, for genius and for patriotism. The grand-duke, who either shared the principles of his family, or had not courage to place himself at the head of the distinguished men who coincided with the view of the Piedmontese minister Cavour, invited Austrian troops, in 1850, again to occupy his dominions, and though Leopold affected to submit to necessity, the Austrian general declared he would not have come uninvited. This occupation lasted six years, during which time the power of life and death of Tuscan subjects was delivered into the hands of the Austrian commanders. When Victor Emmanuel, king of Piedmont and Sardinia, with the assistance of France, made war against Austria for the independence of Italy, in 1859, a vain hope was still entertained that Leopold would have consented to unite his army with that of Piedmont; but the



proclamation of war went forth without a sign from Tuscany. On April 27, 1859, the Tuscan troops unanimously declared their intention to throw down their arms unless they were allowed to join the War of Independence. The liberals insisted on the abdication of Leopold in favor of his son, and on an offensive and defensive alliance with Piedmont. Leopold declined these proposals, and quitted Florence with his family, amidst the silence of the assembled multitudes, never to return.

The following year Victor Emmanuel entered Florence, which in 1865 became the capital of his kingdom of Italy. It was not until 1870 that the hopes of the Florentines were disappointed, and the seat of government was transferred to Rome.

FLORENCE, the county-seat of Lauderdale county, Alabama, is in the northwestern part of the State, on the Tennessee river, at the head of navigation. The city is laid out on a high plateau, 150 feet above high-water. Florence has wide, shady streets, lighted by electricity, and several beautiful parks and drives. Water for both domestic and manufacturing purposes is furnished from three creeks in the vicinity. The manufactories embrace cotton and flour mills, iron furnaces, wagon and agricultural implement works, shoe, bagging, woodenware, sash, door and blind factories, and blast furnaces. Florence has one private and two national banks, three newspaper offices, seven churches, numerous public schools, and is the seat of three colleges. The surrounding country is devoted to agriculture, stock raising, and mining; in the vicinity are found immense deposits of coal and iron ore. Five lines of railway and the river furnish the means of shipping the products of this fertile region. The population of Florence in 1890 was 8,000.

FLORENCE, of Worcester, an English chronicler who lived during the end of the eleventh and beginning of the twelfth century. Nothing is known of him but that he was a monk of Worcester, that he had a great reputation for learning, and that he died on June 5, 1118.

FLORES, also called ENDEH and MANGERAAL, an island of the East Indian Archipelago belonging to the residency of Timor. It lies in a line with Java between Sumbava on the west and Timor on the east.

FLORES, the most westerly of the Azores. See AZORES.

FLOREZ, ENRIQUE, a Spanish historical scholar, was born at Valladolid in 1701. In his fifteenth year he entered the order of St. Augustine. He was a voluminous author of ecclesiastical history. Died 1773.

FLORIAN, the patron saint of Poland, was born at Zeiselmauer, Lower Austria, about the year 190. He is represented as a warrior holding in his hand a vessel from which he pours out flames. His day in the calendar is August 4th.

FLORIAN, JEAN PIERRE CLARIS DE (1755-1794), French poet and romancist, was born at the chateau of Florian, near Sauve, in that part of Languedoc which now forms the department of Gard. His mother, a Spanish lady named Gilette de Salgues, died when he was quite a child, and the person who seemed to have had most influence on his early years was his grandfather, an old noble who had run through his estate. His uncle, the marquis of Florian, who had married a niece of Voltaire, introduced him at Ferney, and Florianet, as he was soon affectionately nicknamed, spent a pleasant time with the old dictator of French literature. In 1768 he became page in the household of the duke of Penthièvre at Anet, and throughout his life he was the object of the powerful patronage of that cultured nobleman. Having studied for some time at the artillery

school at Bapaume he obtained from the duke a commission in a dragoon regiment, and in this capacity it is said he displayed a boisterous behavior as unlike as might be to what the reader of his works would naturally imagine. He afterward left the army and became gentleman in ordinary. On the breaking out of the French Revolution he retired to Sceaux, but he was soon discovered and dragged to prison by the Parisian sans-culottes; and though his incarceration was not of long continuance, it so injured his health that he survived his release only a few months. His death took place on September 13, 1794.

FLORIDA, the most southern of the United States of America, is a large promontory extending southward into the Atlantic ocean, its southern and western coasts forming in part the northern and eastern shore line of the Gulf of Mexico.

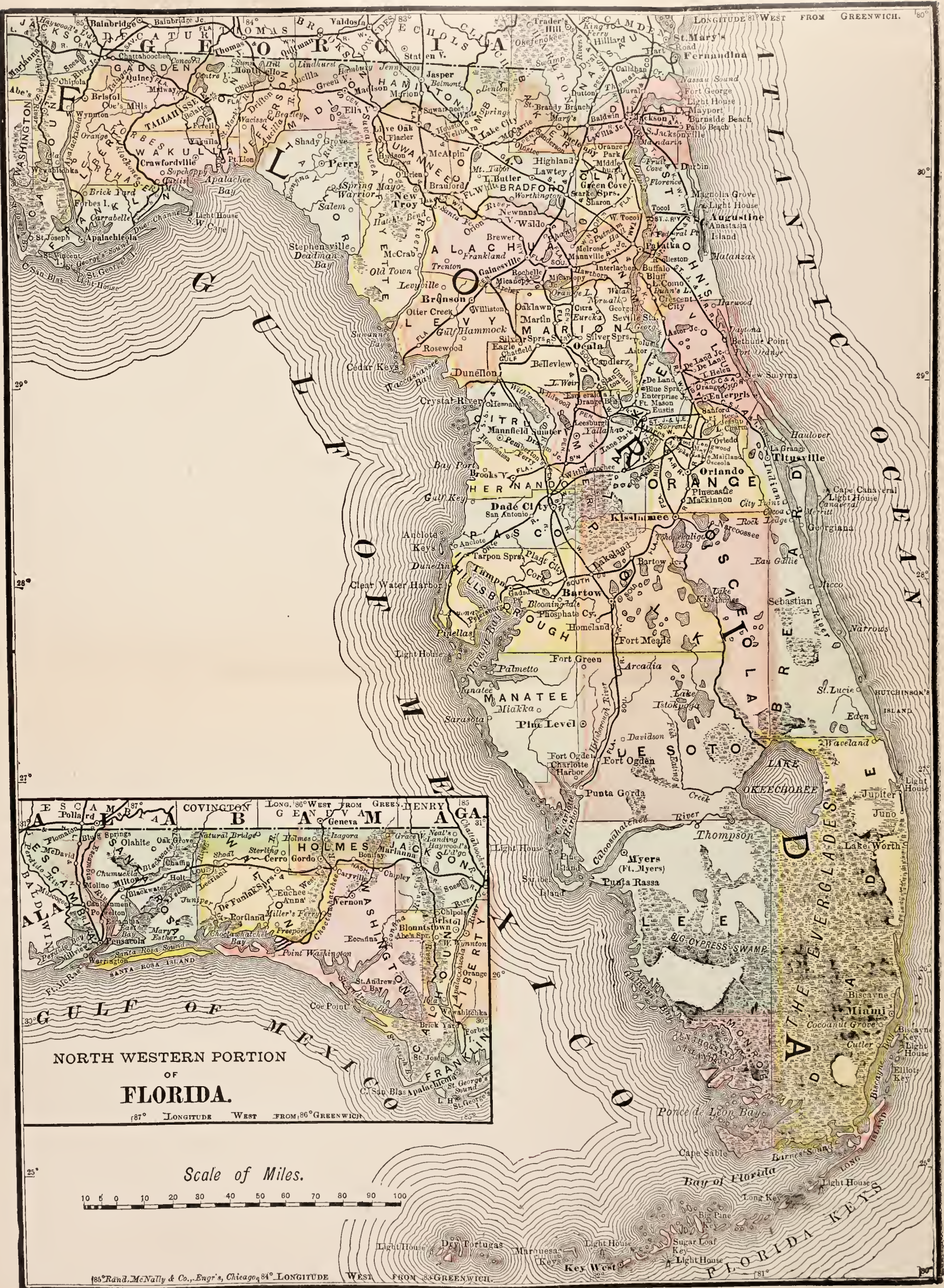
The name of Florida was in the sixteenth and early part of the seventeenth century indefinitely applied to the territory now lying south of Virginia. By its charter the southern boundary of Carolina was fixed at the 29th parallel, thus including about one-half of the present State of Florida. In 1738 the stipulated northern boundary of Florida was a line drawn due west from the mouth of the St. John's river (called by the Spaniards San Juan) to the little river Vasisa, cutting off all upper or continental Florida. At the time of its cession by Spain to Great Britain in 1763, the territory of Florida extended as far west as the Mississippi river, including portions of the present States of Alabama, Mississippi, and Louisiana.

Florida makes the southern boundary of the State of Georgia, and in part that of Alabama, from which it is separated on the northwest by the river Perdido. The Atlantic washes its eastern, and the Gulf of Mexico its southern and western coasts, constituting a sea-board of more than 1,000 miles. On the southeast it is separated from the Bahamas by the Straits of Florida. It points toward Cuba on the south, Havana being about 110 miles from Key West. Its entire length from Perdido river to Cape Sable is about 700 miles, its mean breadth ninety miles. The estimated area of Florida is 59,268 square miles, or 37,931,520 acres, of which 19,888,091 acres were in 1888 included in farms. The population in 1890 was 391,422.

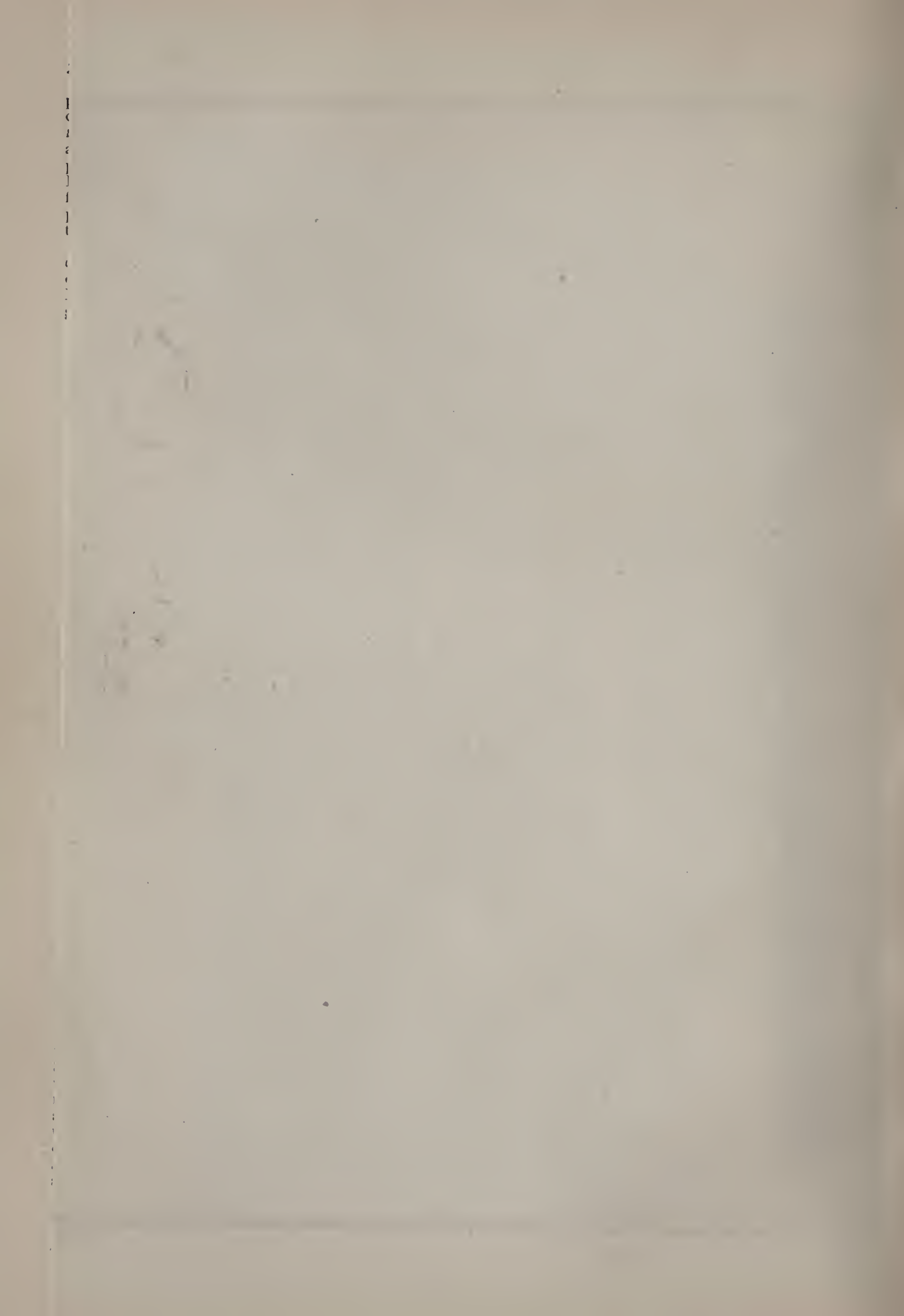
The peninsula proper terminates on the south in Cape Sable; but a remarkable chain of rocky islets, called the Florida Keys, begins at Cape Florida on the eastern shore, extends southwesterly nearly 200 miles in a direction generally conforming with that of the coast, and ends in the cluster of sand-heaped rocks known as the Tortugas, from the great number of turtles formerly frequenting them. South of the bank on which these Keys rise, and separated from them by a navigable channel, is the long, narrow, and dangerous coral ridge known as the Florida Reef. This group of keys and reefs is washed on the south by the constant current of the Gulf Stream. The most important of the keys is Key West, a nautical corruption of *Cayo Hueso* or Bone Key, which name originated in the great number of bones found on the island by the Spaniards, supposed to be those of the aboriginal inhabitants. The island was long the haunt of smugglers and pirates, but is now a busy and thriving place, and one of the most important naval stations possessed by the United States, on account of its commanding situation at the entrance of the most frequented passage into the Gulf of Mexico, as well as its nearness to Havana, Kingston, and other important ports of the West Indies, belonging to European powers.

The Gulf coast of the State is intersected by numerous bays, among which are Pensacola, Choctawhatchee,











St. Andrew's, Appalachicola, Appalachee, Tampa, Charlotte, Ponce de Leon or Chatham, and Florida Bays, the last lying between the Keys and mainland. The chief rivers are St. John's, navigable about 100 miles for vessels of moderate draught, and emptying into the Atlantic after a northerly course of 300 miles; Indian River, a long narrow lagoon on the eastern coast, which it is proposed to unite by a canal with the St. John's; the Suwanee and Ockloconee, which rise in Georgia and flow into the Gulf of Mexico; the Appalachicola, formed by the Chattahoochee and Flint rivers, and emptying into the bay of the same name; Choctawhatchee, Escambia, and Perdido, also flowing into the Gulf. The St. Mary's makes for some distance the northern boundary of the State. Florida has also numerous lakes, some of which are navigable. Lake Okeechobee, in the Everglades, is about forty miles long and thirty broad.

*Surface and Soil.*—The surface is generally level, the greatest elevation being not more than 300 feet above the sea, although old maps represent it as mountainous. The most remarkable feature in the immense tract of marsh filled with islands is the southern part of the State, called the Everglades, and by the Indians "grass-water." Between the Suwanee and Chattahoochee the country is hilly; the western portion of the State is level. De Bow designates the lands as high-hummock, low-hummock, swamp, savanna, and pine. The soil is generally sandy, except in the hummocks, where it is intermixed with clay. These hummocks vary in extent from a few to thousands of acres, and are found in all parts of the State. They are usually covered with a heavy growth of red, live, and water oak, magnolia, pine and dogwood. When cleared they afford desirable openings for cultivation. The savannas are rich alluvions on the margins of streams or lying in detached tracts, yielding largely, but requiring ditching and dyking in ordinary seasons. In the "barrens," as the pine forests are called, the soil is very poor, and thickly overgrown with pine and cypress. The district comprised in the Everglades is impassable during the rainy season, from July to October. It is about sixty miles long by sixty miles broad, covering most of the territory south of Lake Okeechobee, or Big-water. The islands with which this vast swamp or lake is studded vary from one-fourth of an acre to hundreds of acres in extent. They are generally covered with dense thickets of shrubbery or vines, occasionally with lofty pines and palmettoes. The water is from one to six feet deep, the bottom being covered with a growth of rank grass. The vegetable deposit of the Everglades is considered well adapted to the cultivation of the banana and plantain. Another remarkable feature of Florida are the subterranean streams which undermine the rotten limestone formation, creating numerous cavities in the ground called "sinks." These are inverted conical hollows, or tunnels, varying in extent from a few yards to several acres, at the bottom of which running water often appears.

A most remarkable spring, situated twelve miles from Tallahassee, has been sounded with 250 fathoms of line before finding bottom. The outflow forms a beautiful lake, transparent and cold as ice even in the hottest weather. The great sink of Alachua county is a subterranean passage by which the waters of the Alachua savanna are supposed to discharge themselves into Orange Lake. In fact, the geological structure of the State is remarkable, much of its surface seeming a crust through the openings of which underground lakes and rivers force their way.

*Towns and Harbors.*—Notwithstanding the great extent of its sea-coast, Florida has few good harbors. Besides being a naval station, Key West is a place of considerable importance. Pensacola, Appalachicola, St.

Mark's, Cedar Keys, Tampa and Charlotte on the Gulf, and Fernandina and St. Augustine on the Atlantic coast, are the principal ports. Of these the harbors of Pensacola and Fernandina are the best. The cities of Florida are Jacksonville, population in 1890, 17,201; Pensacola, 14,220; Tallahassee, the capital, 3,500; and St. Augustine, 1,717. Jacksonville, on St. John's River, is a flourishing city, much resorted to by invalids from the northern States on account of the salubrity of its climate. Fernandina, the eastern terminus of the railway which crosses the State to Cedar Keys, on the Gulf of Mexico, has 1,722 inhabitants.

*Climate.*—Florida, except in the vicinity of the swamps, possesses one of the most equable and agreeable climates of the continent. Occupying as it does a situation between the temperate and tropical regions, it enjoys exemption from the frosts and sudden changes of the one, and the excessive heat of the other. The mercury, however, sometimes falls to the freezing point, and great damage is done to the orange plantations. The winter climate of the Gulf coast is more rigorous than that of the Atlantic. The seasons partake of the tropical character, winter being distinguishable by copious rains. Statistics show the State to be one of the healthiest, if not the healthiest, of the United States, and its resident population is largely increased in the winter months by invalids from the North, seeking a more genial clime. Jacksonville, St. Augustine and Key West are preferred by this class of visitors, who are every year becoming more numerous. The mean winter temperature as observed at Key West was slightly less than that of Havana; while for the months from July to November it was about the same. Besides the advantage of its climate, the semi-tropical character of Florida offers a grateful and striking change of scene to the health-seeker, who leaves the bare forests and frozen streams of New England for a country teeming with luxuriant vegetation and strewn with flowers.

*Products.*—The productions of Florida are of an essentially tropical character; cotton, tobacco, rice, sugarcane, arrow root, hemp, flax, coffee, and the cocoa-nut flourish there. The climate is also favorable to the cultivation of the silk-worm and for the cochineal insect. Oranges, lemons, bananas, limes, olives, grapes, pine-apples, grow abundantly, and are of exquisite flavor. Indian corn, sweet potatoes, beans, pease, and such products of a more northern climate as Irish potatoes, barley, buckwheat, hops, etc., are also raised. The cultivation and export of oranges and other fruits have grown to be a considerable source of wealth to the State; and the manufacture of cigars, especially at Key West, is an important industry. The pasturage afforded by the savannas is excellent, cattle requiring little or no attention from their owners, and no housing in winter. Game and fish abound in every part of the State. Deer, wild turkeys, partridges, geese, ducks, and other small game are in all the forests and about all the lakes, rivers, and swamps; green turtle, oysters, sheep's-head, red-fish, mullet, etc., are found on all the coasts, and fresh-water fish in all the inland waters. Magnificent sponges are gathered along the reefs, and form a considerable item of trade. Cotton, rice, sugar, tobacco, lumber, fish and fruits may be considered the most valuable products.

Recent discoveries of valuable deposits of phosphate have been made and 51 mining companies with an aggregate capital of over \$20,000,000 have been formed to operate the phosphate deposits.

In 1889 the value of all live stock amounted to \$5,242,256; value of all personal property, \$16,112,047; railroads, \$141,718,002; real estate, \$61,043,843; total valuation of real and personal property, \$91,983,466.



*Education.*—The following statistics exhibit the condition of the public schools during the school year 1888-89; whole number of schools, 2,289. Total enrollment, 86,390; number of white teachers employed, 1,718; number of colored teachers employed, 694; total amount of funds expended from all sources for school purposes and raised by the State and counties, \$476,490; number of white schools operated, 1,691; number of colored schools operated, 598; value of school property owned by the State and counties and used in the school work, \$600,000.

The State Normal Colleges for each race, established by the last Legislature, were organized and opened in October, 1887, at the beginning of the school year.

The one for white students had matriculated fifty students, that for colored students, forty. In both of the colleges tuition is entirely free. The State also supports a flourishing agricultural college and an institute for deaf-mutes and blind children.

At the beginning of 1889 there was a balance in the State Treasury of \$109,813.08. The receipts during the year from all sources were \$680,528.19 and the expenditures \$713,251.20, leaving a balance Jan., 1890, of \$77,090.

The total number of miles of railroad is 2,212, with a total assessment of railroad property amounting to \$12,040,481. There are 1,200 miles of telegraph and 24,000 feet of cable wire of an aggregate value of \$166,834. The steamboat service renders many points accessible not reached by railroads.

The forests of Florida form no inconsiderable source of wealth. The live-oak, so valuable in shipbuilding, abounds, also the other varieties of oak, swamp cypress, hickory, pine, magnolia, dogwood and laurel. The palma christi (castor-oil bean) becomes here a large tree; on the islands and keys, boxwood, satinwood, mastic and lignum-vitæ grow abundantly. The pine is found from Cape Sable to near Indian river. In addition to fruit-bearing species, the pimento, coffee, pepper, clove and other spice trees and shrubs may be successfully cultivated.

The history of Florida is interesting. The various attempts at colonization by Europeans of which we have authentic accounts, go farther back than in any other part of the North American continent, preceding the efforts of the French in Canada, the English in Virginia, and even of the Spaniards themselves in Mexico. St. Augustine is the oldest settlement founded by Europeans, not only of the United States, but of North America, and still shows traces of Spanish occupation two centuries ago. Remains of fortifications, roads, etc., are found between the Suwanee and Chattahoochee. In 1512, seven years before the invasion of Mexico by Cortes, Juan Ponce de Leon discovered the mainland of Florida on Easter Sunday, *Pascha Floridum*, the supposed derivation of the name. The discoverer landed at a place called the Bay of the Cross, took formal possession, and planted a stone cross in sign of the jurisdiction of Spain. He continued his explorations in the interior and along the coast for some months before sailing to Spain. The following year he was named governor of and received permission from Ferdinand to colonize the "Island of Florida." His efforts, however, proved unsuccessful. The place of his original landing is supposed to be a few miles north of Saint Augustine.

The next effort at colonization was the disastrous one of Pamphilo de Narvaez in 1528. He sailed from Cuba with 400 men, landed in the bay of Pensacola, and remained in the country nearly six months, when he embarked and perished in a tempest near the mouth of the Mississippi. Four survivors of this expedition succeeded, after incredible hardships, in reaching Mexico.

Hernando de Soto landed on May 30, 1539, at what is now Tampa Bay, called by the Spaniards "Spiritu Santo." De Soto believed Florida a new El Dorado. He had the title of *Adelantado*, or president, from the emperor, and undertook the conquest at his own expense. He passed the first winter in the country of the Appalachians, east of Flint river. After a sanguinary conflict with the natives, who opposed his advance into the interior, and the loss of many men by disease, De Soto reached the Mississippi, where he died from fever while endeavoring to descend its banks to the mouth.

Réné Goulaine de Laudonnière, who had accompanied Jean Ribault in his expedition to Port Royal (1562), landed first at what is now St. Augustine, subsequently in the river St. John, called by him the "River of May," and built Fort Caroline in 1564. The colonists, who were Huguenots, were on the point of abandoning the settlement when reënforced by Ribault; but he had scarcely anchored when a Spanish fleet under Menendez appeared. Ribault made his escape for the moment. Soon after Menendez surprised and massacred the garrison of Fort Caroline, carrying out to the letter his barbarous order to "gibbet and behead all Protestants in those regions." In endeavoring to return to Fort Caroline, Ribault and his party also fell into the hands of Menendez, and shared the fate of their companions. The French were all hanged with the inscription affixed to them—"Not as Frenchmen, but as heretics."

Aviles de Menendez, referred to as exterminating the French settlement on the St. John, landed September, 1565, and laid the foundation of the town, named by him St. Augustine. Two years later a French expedition commanded by Dominique de Gourgues, seized two forts near the mouth of the St. John, and the important one of San Mateo, and in retaliation for the cruelty of Menendez hanged all his prisoners, "not as Spaniards, but as assassins." De Gourgues' head was demanded by the Spanish king, and he was for a time compelled to live in concealment. Menendez afterward rebuilt San Mateo.

On May 28, 1586, Sir Francis Drake, then returning from his memorable expedition to the West Indies, discovered a scaffold raised upon four high masts, evidently a look-out station, upon the Florida coast. No one in the fleet had any knowledge that the Spaniards possessed a place there. Drake therefore ordered the pinnaces to make a reconnoissance. Having entered an inlet they came to the fort St. Juan de Pinos, from which the garrison fled to St. Augustine; and on the approach of the English they also abandoned this place, which had the appearance of a prosperous settlement, with its council-house, church, and handsome gardens. The invaders destroyed the town and meditated an attack on St. Helena, twelve leagues further up the coast, but were deterred from want of a pilot to conduct them safely through the intricate and dangerous shoals. Drake pursued his voyage to Virginia, where the queen had commanded him to afford relief to Sir Walter Raleigh's newly planted colony.

The English colonists of Georgia and Carolina continued to wage war against the Spaniards in Florida. Governor Moore of South Carolina made an unsuccessful attempt on St. Augustine in 1702; and General Oglethorpe of Georgia besieged it in 1740 with the same result. Nearly a hundred years later, in 1837, the United States engineers found balls thrown by Oglethorpe in the moat of the old Spanish fortress. In 1763 Florida was ceded to Great Britain in return for Havana, captured by Albemarle the previous year. Most of the Spaniards left the country. Vigorous efforts were made



by the British Government to promote settlement by liberal grants of land to settlers. Besides a large number of emigrants who came over from Europe, promising settlements were made under the patronage of Lords Rolle and Beresford and Governor Moultrie. In addition to these, many royalists emigrated thither from Georgia and Carolina, on the breaking out of hostilities between Great Britain and her American colonies. Twenty years of British possession accomplished more in settling and improving Florida than 200 years of Spanish rule.

In 1781 Don Bernardo de Galvez, Spanish governor of Louisiana, having previously taken Mobile, besieged and captured Pensacola, thus completing the conquest of West Florida. In 1783 Florida was ceded back to Spain, when the greater part of the English population, estimated at 25,000, left the province and passed into the adjoining states. Some unimportant military operations took place in 1814. In February, 1819, a treaty for the cession of Florida to the United States was concluded at Washington, and in 1821 was reluctantly ratified by the king of Spain, thus concluding a long and tedious negotiation. Possession was taken in July by General Jackson, who had been appointed governor of the Floridas by the Government at Washington. Immigration flowed in rapidly from the southern States, the Bahamas, and even the North Atlantic States; but a great drawback to the prosperity of the newly-acquired territory was found in the determined resistance of the warlike nation of Seminole Indians to the encroachments of the whites upon their hunting-grounds. A resolution on the part of the United States Government to remove these Indians led to the long and bloody struggle known as the Seminole War, in which for seven years the Indians successfully defied every effort to subdue them, retreating into the fastnesses of the Everglades when closely pressed. Osceola, chieftain of the Seminoles, having been captured by treachery, the war ended in 1842. The remnant of the Indians were removed beyond the Mississippi, and in three years after their expulsion (1845) Florida was admitted into the Union as a State.

On January 10, 1861, Florida, by a convention assembled on the 3d, seceded from the Union. Fort Marion and the arsenals at St. Augustine and Chattahoochee were seized on the 7th, the forts and dockyards at Pensacola on the 12th, except Fort Pickens, on Santa Rosa island, which was held by the United States forces. Not being within the line of great military operations, the conflicts between the Federal and Confederate forces were of minor importance. Fernandina, Jacksonville and St. Augustine fell into the hands of the national forces early in 1862. Pensacola was reoccupied by them the same year. In April, 1865, President Johnson, by a proclamation, declared the restrictions on commercial intercourse with Florida removed; in July, William Marvin was named provisional governor. A State convention assembled in October at Tallahassee, which repealed the ordinance of secession. Civil government was practically resumed the following year by the election of State officers and a legislature. A subsequent State convention met at Tallahassee, January 20, 1868, to form a new constitution, which was ratified by the people in May, a legislature and State officers being chosen at the same election. The State having complied with the enactments of Congress relative to reconstruction, resumed its place in the Union. In 1876 the election of Rutherford B. Hayes, republican, as president of the United States, over Samuel J. Tilden, democrat, was determined by the electoral votes of Florida and Louisiana, which, by a decision of the extraordinary commission created by Congress, were counted for the former.

FLORIDA-BLANCA, DON JOSE MONINO Y REDONDO, COUNT OF, Spanish statesman, was born at Murcia, in 1723. For a time he followed the profession of an advocate, and acquired a high reputation. A more public career was opened to him by the marquis of Esquilache, then chief minister of state, who sent him as ambassador to Pope Clement XIV. Successful in his mission, he was soon after appointed by Charles III. successor to his patron, and his administration was one of the most brilliant Spain had ever seen. He regulated the police of Madrid, reformed many abuses, projected canals, established many societies of agriculture and economy, and many philanthropical institutions, and gave encouragement to learning, science, and the fine arts. Commerce flourished anew under his rule, and the long-standing disputes with Portugal about the South American colonies were settled. He sought to strengthen the alliance of Spain with Portugal by a double marriage between the members of the royal houses, designing by this arrangement to place ultimately a Spanish prince on the throne of Portugal. But in this he failed. His attacks on Algiers in 1775, and on Gibraltar in 1782, cost Spain the loss of nearly 80,000 men. He dealt a heavy blow to the Cortes, prevailing upon them by various forms of bribery, and by sowing dissension among the members, to proclaim the heir to the throne without making the customary assertion of their privileges. He retained his office for three years under Charles IV.; but in 1792, through the influence of his enemies, he was dismissed and imprisoned in the castle of Pampeluna. Here he was saved from starvation only by the intervention of his brother. He was afterward allowed to retire to his estates, and remained in seclusion till the French invasion of 1808. He was then called by his countrymen to take the presidency of the central junta. But his strength failed him, and he died at Seville, November 20th of the same year.

FLORIDA, GULF OF, the name given to the channel between Florida and the Bahamas, traversed by the Gulf Stream. From Florida Reefs on the south to Settlement Point, the most northern of the Bahamas in the channel, is 200 miles long; greatest breadth at the southern extremity 150 miles; at the northern 65 miles.

FLORIN was the name of a gold coin first struck in Florence in the thirteenth century. It was the size of a ducat, and had on one side a lily, and on the other the head of John the Baptist. Some derive the name from the city, and others from the flower. These coins were soon imitated all over Europe. The gulden or florin is the unit of account in Austria, and has a value of 50 cents.

FLORIO, GIOVANNI, lexicographer and translator, was born in London about 1552. He was of Tuscan origin, his father and mother being Waldenses who had fled from persecution in the Valtelline and taken refuge in England. The family left England on the accession of Queen Mary, but returned after her death. The son resided for a time at Oxford, and was appointed, about 1576, preceptor to the son of Barnes, bishop of Durham, then studying at Magdalen college. Three years later Florio was admitted a member of Magdalen college, and became a teacher of French and Italian in the university. His last work, and that by which he has been most known, was his translation of Montaigne's *Essays*, published in folio in 1603, and dedicated to the Queen. Special interest attaches to this translation from the circumstance that of the several copies of the first edition in the British Museum library one bears the autograph of Shakespeare, and another that of Ben Jonson. When the plague raged in London in 1625, Florio sought es-



cape from it by retiring to Fulham; but he was there seized and carried off by it in the autumn of the same year.

FLORIS, FRANS, or more correctly Frans de Vriendt called Floris (1520), was one of a large family trained to the study of art in Flanders. At the age of twenty he went to Liège, and took lessons from Lambert Lombard, a pupil of Mabuse, whose travels in Italy had transformed a style truly Flemish into that of a mongrel Leonardesque. Following in the footsteps of Mabuse, Lambert Lombard had visited Florence, and caught the manner of Salviati and other pupils of Michelangelo and Del Sarto. It was about the time when Schoreel, Coxcie, and Heemskerck, after migrating to Rome and imitating the masterpieces of Raphael and Buonarroti, came home to execute Dutch-Italian works beneath the level of those produced in the peninsula itself by Leonardo da Pistoia, Nanaccio, and Rinaldo of Mantua. Fired by these examples, Floris in his turn wandered across the Alps, and appropriated without assimilation the various mannerisms of the schools of Lombardy, Florence and Rome. Bold, quick, and resolute, he saw how easy it would be to earn a livelihood and acquire a name by drawing for engravers and painting on a large scale after the fashion of Vasari. He came home, joined the guild of Antwerp in 1540, and quickly opened a school from which 120 disciples are stated to have issued. Floris painted strings of large pictures for the country houses of Spanish nobles and the villas of Antwerp patricians. He is known to have illustrated the fable of Hercules in ten compositions, and the liberal arts in seven, for Claes Jongeling, a merchant of Antwerp, and adorned the duke of Arschot's palace of Beaumont with fourteen colossal panels. Comparatively few of his works have descended to us, partly because they came to be condemned for their inherent defects, and so were suffered to perish, partly because they were soon judged by a different standard from that of the Flemings of the sixteenth century. The earliest extant canvas by Floris is the *Mars and Venus ensnared by Vulcan*, in the Berlin Museum (1547), the latest a *Last Judgment* (1566) in the Brussels gallery. Neither these nor any of the intermediate works at Alost, Antwerp, Copenhagen, Dresden, Florence, Léau, Madrid, St. Petersburg, and Vienna display any charm of originality in composition or in form. While Floris was engaged on a *Crucifixion* of twenty-seven feet, and a *Resurrection* of equal size, for the Grand Prior of Spain, he was seized with illness, and died on October 1, 1570, at Antwerp. His burial took place three days later in the cemetery of the Récollets.

FLORUS, a Roman historian, author of the *Epitome de Gestis Romanorum*, has by some writers been identified with the Lucius Julius Florus who lived in the time of Augustus, and to whom Horace addressed two of his epistles; but this position is hardly tenable, as Florus in the introduction to his history writes of the emperor Trajan as then reigning. By others he is, on account of certain similarities in style, identified with the Publius Annius Florus who lived in the time of Hadrian, and wrote a dialogue on the question whether Virgil was an orator or a poet, and the *Pervigilium Veneris*, an imitation of Horace's *Secular Hymn*.

FLOTSAM, JETSAM and LIGAN, in English law, are goods lost at sea, as distinguished from goods which come to land, which are technically called *wreck*. "Jetsam is when goods are cast into the sea, and there sink and remain under water; flotsam is where they continue swimming on the surface of the waves; ligam is where they are sunk in the sea, but tied to a cork or buoy in order to be found again." They belong to the king in

the absence of the owner. (See the article **WRECK** for the law relating to that subject.)

FLOUNDER is one of the most common flat-fishes along the coasts of northern Europe, from the British Channel to Iceland. It is more partial to fresh water than any other flat-fish, ascending rivers far beyond the reach of the tide, as, for instance, the Rhine as far as Cologne. It very rarely exceeds the length of twelve inches, and a weight of one and a half pounds.

FLOUR, MANUFACTURE OF. Flour is the grain of wheat reduced to powder, and separated from the outer husk or coverings in which the seed is enveloped. The name is also applied to the grain of other cereals, and to the farinaceous seed of pulses similarly treated, and it is used generally to indicate any finely powdered dry substance; but when the term is employed without any qualification, it invariably means wheaten flour. As preparations of flour form the staple food of all civilized communities of the West, the cultivation of wheat and the manufacture of flour are necessarily industries of the greatest magnitude and importance, rice being the only other grain which rivals (and which indeed possibly surpasses) wheat in the number of human beings it feeds.

The cultivation of wheat was one of the earliest developments of human civilization, and there are not wanting evidences that in making use of the grain the primitive races submitted it to a coarse pounding or grinding, thereby reducing it to a state resembling the meal of the present day. From remains found on the sites of the ancient lake dwellings of Switzerland it is obvious that the original form of corn-crushing or meal-making apparatus consisted of a roundish stone—generally very hard sandstone—about the size of a man's fist, with certain hollows or flattened surfaces on two opposite sides. The rounded outline of the stone worked and fitted into a corresponding cavity in another stone in which the grain to be crushed or pounded was placed. By the deepening of the cavity in the under stone and the addition of a wooden handle to the upper stone-ball would be formed the mortar and pestle; and in another direction, by fitting the upper stone for a motion of rotation within the cavity of the lower, the form of the quern would be produced, and the germ of the modern flour-mill elaborated. In early times, and indeed amid rude forms of society still, the preparation of meal and flour was a part of the domestic operations of preparing bread and otherwise cooking of food.

The ordinary flour mill of the present day is a structure of comparatively few essential parts; but in the arrangement and mounting of these the greatest amount of mechanical skill and experience has been exercised, and the accessories of the mill have been elaborated with much care, with the view of saving manual labor and perfecting the processes and results. Fully to appreciate the various processes of modern milling, it is necessary to bear in mind, not only that the wheat as delivered at the mill is dusty and mixed with sand and other refuse, but that it contains many light grains and seeds of foreign substances, which might be deleterious, and would certainly interfere with the appearance of the finished flour. Again, the structure of the wheat grain itself must not be overlooked. A grain (caryopsis) of wheat is not a seed, but a fruit consisting of a pericarp or outer envelope tightly adherent to its contained single seed. The envelope consists of several layers of ligneous tissue, within which are the embryo and a peculiar fermentive nitrogenous principle termed cerealine, and finally a central mass of thin cells filled with a white powdery substance largely composed of starch granules. The object of ordinary milling is to grind as perfectly as possible, without breaking the minute granules, the central substance of the grain, and to separate it from



the embryo and outer husks, the former constituting the flour, and the latter the bran of the miller. Whole wheaten flour, on the other hand, consists of the entire grain ground up to a uniform mass.

*Flator Ordinary Milling.*—In the ordinary or flat millstone milling there are three main points to consider — (1) the cleaning and preparation of the wheat; (2) the grinding; and (3) the bolting or dressing of the ground products. The ordinary cleaning or screening apparatus through which the wheat, as received, passes, consists of a kind of cylindrical sieve of wire cloth, mounted in a sloping position, and having internal partitions so as to resemble an Archimedean screw. When the apparatus is set in motion, the grain, fed in at its upper end, tumbles from one division into another, thereby being freed from small refuse and sand, and as it issues at the lower extremity is subjected to a fan blast. For cleaning grain there are other kinds of apparatus, in which the principle of aspiration, or drawing currents of air through the grain, is now extensively employed. A further cleaning is sometimes given by a decorticator, an implement which can be adjusted at will, for simply rubbing and scouring the grain, or for removing the thin bran and germ previous to the operation of grinding. The brush machine is an apparatus for polishing and finishing wheat, its peculiar feature being that the “opposed brushes are constructed and worked in such a manner that they come in contact with every kernel of wheat in every conceivable position, and with as much force as the miller chooses to use — thus polishing it on the ends better than any other machine can do, and this not only on one pair of brushes, but on several.” The prepared grain is next conveyed to the grinding apparatus, and here it may be said that, in moving the grain or flour horizontally, Archimedean screws working within an inclosed casing are employed, while in lifting from one floor to another, small boxes mounted on an endless band worked over pulleys and similarly encased are used. The grinding machinery consists first of a bin containing the grain to be ground, from which it passes by a spout to the hopper, whence it is delivered by a feeding adjustment to the stones. These constitute the distinctive feature of the entire mill, and upon their condition and delicate adjustment the whole success of the milling operation turns. They consist of two flat cylindrical masses inclosed within a wooden or sheet metal case, the lower or “bed-stone” being permanently fixed, while the upper or “runner” is accurately pivoted and balanced over it. The average size of mill-stones is about four feet two inches in diameter by twelve inches in thickness; and they are made of a hard but cellular silicious stone called ‘buhr-stone, the best qualities of which are obtained from La-Ferté-sous-Jouarre, department of Seine-et-Maine, France. Millstones are generally built up of segments, bound together around the circumference by an iron hoop, and backed with plaster of paris. The bedstone is dressed to a perfectly flat plane surface, and a series of grooves or shallow depressions are cut in it. The grooves on both sides are made to correspond exactly, so that when the one is rotated over the other the sharp edges of the grooves, meeting each other, operate like a rough pair of scissors, and thus the effect of the stones on grain submitted to their action is at once that of cutting, squeezing, and crushing. The dressing and grooving of millstones is generally done by hand-picking, but sometimes black amorphous diamonds (carbonado) are used, and emery wheel dressers have likewise been suggested. The upper stone or runner is set in motion by a spindle on which it is mounted, which passes up through the center of the bed-stone, and there are screws and other

appliances for adjusting and balancing the stone. Further, provision is made within the stone case for passing through air to prevent too high a heat being developed in the grinding operation; and sweepers for conveying the flour to the meal spout are also provided. The ground meal delivered by the spout is carried forward in a conveyer or creeper box, by means of an Archimedean screw, to the elevators, by which it is lifted to an upper floor to the bolting or flour-dressing machine. The form in which this apparatus was formerly employed consisted of a cylinder mounted on an inclined plane, and covered externally with wire cloth of different degrees of fineness, the finest being at the upper part of the cylinder where the meal is admitted. Within the cylinder, which was stationary, a circular brush revolved, by which the meal was pressed against the wire cloth, and at the same time carried gradually toward the lower extremity, sifting out as it proceeded the mill products into different grades of fineness, and finally delivering the coarse bran at the extremity of the cylinder. For the operation of bolting or dressing, hexagonal or octagonal cylinders, about three feet in diameter and from twenty to twenty-five feet long, are now commonly employed. These are mounted horizontally on a spindle for revolving, and externally they are covered with silk of different degrees of fineness, whence they are called “silks” or silk dressers. Radiating arms or other devices for carrying the meal gradually forward as the apparatus revolves are fixed within the cylinders, and there is also an arrangement of beaters which gives the segments of cloth a sharp tap, and thereby facilitates the sifting action of the apparatus. Like all other mill machines, the modifications of the silk dresser are numerous. Mill products are differently assorted and classified in various localities and different mills — some distinguishing many qualities of flour and bran, and others making only three or four divisions.

An additional proportion of fine flour is obtained by dressing and remilling tailings and middlings, and the purification and regrinding of these products have now become of much consequence in connection with the changed systems of milling rapidly coming into use. A great variety of middlings purifying machines have been introduced and eagerly pushed within the last few years, showing that this branch of economic milling is now receiving great attention.

*The Hungarian System or High Milling.*—The object of the low or flat milling process is to produce at one grinding operation as large a proportion of good finished flour as possible. In high milling, on the other hand, the stones are kept so far apart that grain is merely bruised in the first operation, and by a series of such grindings or bruising, alternated with elaborate sifting, the bran and all the outer envelopes with the cerealine are detached, and a nucleus of very pure semolina only left. In this way a large proportion of very inferior, branny flour is obtained in these early millings, and the proportion of exceedingly fine, strong flour, for which Austro-Hungarian millers are famous, is comparatively small. It is only to the hard, brittle wheats that the Hungarian system of milling is applicable, and the method is only practicable under circumstances where there is a demand for the two extreme qualities of mill product which result from the system. Within the last few years the Hungarian millers have very largely adopted the roller mills, either to supplant entirely or to supplement the stone grinding.

*Roller Mills.*—In this form of mill a pair of horizontal rollers rotate face to face, and the grain or other material is submitted to their action by passing between them. The nature of that action varies according to the modification of roller surfaces, the closeness of the



rollers to each other, and the equal or differential rate at which they revolve. Rollers of metal, either steel or chilled iron, having a toothed surface, revolving at different rates of speed and at definite distances apart, have a cutting action on the grain submitted to them. The roller mill is now in almost universal use in large flour manufactories, particularly in America. In the mills at St. Paul and Minneapolis they are almost exclusively used, and the product is said to be greater and better than by the old stone process.

FLOURENS, GUSTAVE, a French social democrat and writer, a son of M. J. P. Flourens, was born at Paris, August 4, 1838. Before he had attained his twenty-first year he obtained, at the college of Louis-le-Grand, the diplomas of licentiate in letters and in sciences. In 1863 he undertook for his father a course of lectures at the Collège de France, the subject of which was the history of mankind. His theories as to the manifold origin of the human race, however, gave offense to the clergy, and he was precluded from delivering a second course. He then repaired to Brussels, where he published his lectures under the title of *Histoire de l'Homme*; he next visited Constantinople and Athens, took part in the Cretan insurrection of 1866, spent some time in Italy, where an article of his in the *Popolo d'Italia* caused his arrest and imprisonment, and, finally, having returned to France, nearly lost his life in a duel with Paul de Cassagnac, editor of the *Pays*. In Paris he devoted his pen to the cause of republicanism, and at length, having failed in an attempt to organize a revolution at Belleville, February 7, 1870, found himself compelled to flee from France. Returning to Paris on the downfall of Napoleon, he soon placed himself at the head of a body of 500 tirailleurs. On account of his insurrectionary proceedings he was taken prisoner at Créteil, near Vincennes, by the provisional government, and confined at Mazas, December 7, 1870, but was released by his men on the night of January 21, 1871. On March 18th he joined the Communists. As colonel of the nineteenth and twentieth arrondissements he took part in an attack on Versailles, and early in the morning of April 3d was killed in a hand-to-hand conflict at Rueil, near Malmaison.

FLOURENS, MARIE JEAN PIERRE, a celebrated French physiologist, was born at Maureilhan, near Béziers, in the department of Hérault, April 15, 1794. At Paris, Flourens engaged in physiological research, occasionally contributing to literary publications; and in 1821, at the Athénée there, he gave a course of lectures on the physiological theory of the sensations, which attracted much attention among men of science. His paper entitled *Recherches expérimentales sur les propriétés et les fonctions du système nerveux dans les animaux vertébrés*, in which he, from experimental evidence, sought to assign their special functions to the cerebrum, corpora quadrigemina, and cerebellum, was the subject of a highly commendatory report by Cuvier, adopted by the French Academy of Sciences, July 22, 1822. He was chosen by Cuvier in 1828 to deliver for him a course of lectures on natural history at the Collège de France, and in the same year became, in succession to Bosc, a member of the Institute, in the division "Économie rurale." In 1830 he became Cuvier's substitute as lecturer on human anatomy at the Jardin du Roi, and, in 1832, was elected to the post of titular professor, which he vacated for the professorship of comparative anatomy, created for him at the museum of the Jardin the same year. In 1833 Flourens, in accordance with the dying request of Cuvier, was appointed a perpetual secretary of the Academy of Sciences; and, in 1838, he was returned as a deputy for the arrondissement of Béziers. In 1840 he was elected, in preference to Victor

Hugo, to succeed Michaud at the French Academy; and he was created, on April 24, 1845, a commander of the legion of honor, and, in the next year, a peer of France. In March, 1847, Flourens directed the attention of the Academy of Sciences to the anæsthetic effect of chloroform on animals; and it is an interesting fact in the history of therapeutics that "chloric ether," a spirituous solution of chloroform, was, in the spring of the same year, first employed, at the suggestion of Dr. M. C. Furnell, in surgical operations at St. Bartholomew's Hospital. On the revolution of 1848, Flourens withdrew completely from the political world; and, in 1855, he accepted the professorship of natural history at the Collège de France. Three years before his death, which took place at Montgeron, near Paris, December 6, 1867, he retired from his active duties at the Academy of Sciences.

FLOWERS, ARTIFICIAL. There are few branches of ornamental work used in the decoration of ladies' apparel which have more increased in importance than that of artificial flower making. Artificial flower making is almost entirely done by hand, giving occupation principally to young women and children, the majority of whom work at home or in small shops. It is not entirely a woman's work, however, for men are employed, particularly in Paris, in cutting out the material for the flowers by a stamp machine, in which sixteen or twenty folds are operated upon at once, the folds being colored green, blue, crimson, according to the flower which is to be imitated. Each piece is taken up separately by a girl armed with a pair of pincers, who, with one dexterous movement, molds it, as it were, roughly into the shape of the flower, and then passes it on to another who gives a more precise form to the petal. A third girl attaches each petal to a very fine wire, thread having been previously twisted round this wire to form the stalk; while the remaining operations consist in goffering the petals and leaves to give them a curl, and finally gumming or waxing them over, or dusting them with fine powdered glass or potato flour to represent the bloom. The rapidity and accuracy with which these various processes are completed are very remarkable. A new style of artificial flower has come into vogue, made by the "enamel process," in which a young girl sits by a jet of flame, holding in her hand a stick of prepared glass. A momentary application to the flame makes the end of the stick red hot, and while it is still in a pasty state, the operator pulls out a short length, and immediately rolls it up into the form of the petal or leaf, and passes it on to the painter for the proper coloring. The remaining processes are similar to those of the ordinary artificial flowers. These enamel flowers, though wondrously true and pretty, are more suited for room decoration than for dress. While apparently a light and pleasant work, artificial flower making is not one of the healthiest of our trades, partly for the reason that it is so often carried on in small household shops, where ventilation is of the scantiest.

FLOYER, SIR JOHN (1649), M.D., physician and author, was born at Hinters in Staffordshire, and was educated at Oxford. He practiced in Lichfield, and it was by his advice that Doctor Johnson, when a child, was taken by his mother to be touched by Queen Anne for the king's evil, March 30, 1714. Doctor Johnson had a high opinion of his learning and piety. Floyer died February 1, 1734.

FLUDD, ROBERT, an English physician and mystical philosopher, was the son of Sir Thomas Fludd, treasurer of war to Queen Elizabeth in France and the Low Countries, and was born at Milgate, Kent, in 1574. Though rapt in mystical speculation, Fludd did not disdain scientific experiments, and is thought by some to



be the original inventor of the barometer. He died in 1637.

FLÜGEL, GUSTAV LEBRECHT, a German Orientalist, was born at Bautzen, February 18, 1802. He received his early education at the gymnasium of his native town, and studied theology and philology at Leipsic. Gradually he devoted his attention chiefly to Oriental languages, which he studied especially at the universities of Vienna and Paris. In 1832 he became professor at the district school of Meissen, but ill health compelled him to resign that office in 1850, and in 1851 he went to Vienna, where he was employed in cataloguing the Oriental manuscripts of the court library. He died at Dresden, July 5, 1870.

FLÜGEL, JOHANN GOTTFRIED, a German lexicographer, was born at Barby near Magdeburg, November 22, 1788. He was originally a merchant's clerk, but emigrating to America in 1810, he made a special study of the English language, and returning to Germany in 1819, he was in 1824 appointed professor of the English language in the university of Leipsic. In 1838 he became American consul, and subsequently representative and correspondent of many literary and scientific institutions of America. He died June 24, 1855.

FLUORINE, one of the halogen group of chemical elements, symbol F, atomic weight 19.1. The compound fluorine forms with hydrogen, namely, hydrofluoric acid, or hydrogen fluoride, was known so long ago as 1670 for its property of etching on glass; by Scheele it was regarded as a substance containing oxygen with some other element; and by Ampère, in 1810, it was shown to consist of hydrogen with a new element, which from its source fluor spar received the name of fluorine. Fluorine is one of the less abundant, but one of the most widely diffused of the elements. It occurs in nature always combined with other elements, as in fluor spar (see below), in CRYOLITE, and in fluor-apatite; in the rarer mineral stopaz, ytrocercite, wagnerite, wavelite, and others; also in small quantities in some granites and trap rocks; in river and mineral waters; and in sea water, according to Forchhammer, to the extent of half a grain in 100 pounds.

FLUOR SPAR, FLUORITE, or CALCIUM FLUORIDE. Fluor spar is a brittle, transparent to sub-translucent mineral, with a perfect octahedral cleavage, a vitreous, sometimes splendent, luster, a hardness of 4, and a specific gravity of 3.01–3.25. Before the blowpipe it decrepitates, tinges the flame dull red, and fuses into an enamel. Heated with concentrated sulphuric acid it yields hydrofluoric acid (see CHEMISTRY). In color fluor spar varies much, being blue, purple, green, yellow, pink, or brown; it is sometimes dichroic.

FLUSHING, a fortified seaport town of the province of Zealand, Holland, is situated on the island of Walcheren, at the mouth of the estuary of the Western Scheldt, about four miles south of Middleburg, and fifty miles southwest of Rotterdam. Population, 9,500.

FLUSHING, a post-village of Queens county, N. Y., is situated on Long Island at the head of Flushing bay, about seven miles northeast of New York, and eight northeast of Brooklyn. Population (1889), 10,868.

FLUTE, a wind instrument which in a variety of forms has been in constant use from the earliest ages. To Olympus the Phrygian has been ascribed the introduction of flute-playing into Greece, an art which was much encouraged in the later days of the empire. The Greeks employed professional flute-players in many of their religious ceremonies, and competitive trials of skill were frequent. Various systems of fingering have been introduced from time to time by the most eminent flutists and flute-makers, and concertos for the flute as a solo instrument have been composed with a view to

exhibiting the powers of celebrated performers. In orchestral scores the flute part is generally placed at the top, and is written in the violin or G clef. The *piccolo* or octave flute, the E flat or *tierce*, the D flat or *minor ninth* (transposing piccolo), the *flute d'amour*, a minor third below the ordinary instrument — are all varieties of the *traverso*, which, like the fife, is blown by an oval shaped hole in the side, near the stopped end of the tube. The flageolet is a smaller variety of the old *flute-à-bec*, and was formerly used in the orchestra. Handel has written an *obligato* part for it in the well-known baritone air "O, ruddier than the cherry." The fife, much used in military bands, is simply an octave flute in D, played horizontally, and having six finger holes and one key.

FLUX. See METALLURGY.

FLUXIONS. See INFINITESIMAL CALCULUS.

FLY. See DIPTERA and INSECTS.

FLY-CATCHER, a name introduced in ornithology by Ray, being a translation of the *Muscicapa* of older authors, and applied by Pennant to an extremely common English bird, the *M. grisola* of Linnæus. It has since been used in a general and very vague way for a great many small birds from all parts of the world, which have the habit of catching flies on the wing, and thus ornithologists who have trusted too much to this characteristic and to certain merely superficial correlations of structure, especially those exhibited by a broad and rather flat bill and a gape beset by strong hairs or bristles, have associated under the title of *Muscicapidae* an exceedingly heterogeneous assemblage of forms that, though much reduced in number by later systematists, has scarcely yet been sufficiently revised.

FLYING-FISH are of two different kinds. The one (*Dactylopterus*) belongs to the Gurnard family (*Triglidæ*), and is more properly called Flying Gurnard; the other (*Exocoætus*) has been called Flying Herring, though more nearly allied to the Gar-pike than to the Herring. Some other fishes with long pectoral fins (*Pterois*) have been stated to be able to fly, but this has been proved to be incorrect. The Flying Gurnards are much less numerous than the *Exocæti* with regard to individuals as well as species, there being only three or four species known of the former, while more than fifty have been described of the latter, which, besides, are found in numerous shoals of thousands. The *Dactylopteri* may be readily distinguished by a large bony head armed with spines, hard keeled scales, two dorsal fins, etc. The *Exocæti* have thin, deciduous scales, only one dorsal fin, and the ventrals placed far backward, below the middle of the body; some have long barbels at the chin. In both kinds the pectoral fins are greatly prolonged and enlarged, modified into an organ of flight, and in many species of *Exocætus* the ventral fins are similarly enlarged, and evidently assist in the aerial evolutions of these fishes. Flying fishes are found in the tropical and sub-tropical seas only, and it is a singular fact that the geographical distribution of the two kinds is nearly identical. The literature on the subject of flying fishes is very extensive, and great diversity of opinion exists among observers as regards the mode and power of their flight; but the most reliable agree that the fishes do not leave the water for the purpose of catching insects, and that they are unable to move their fins in the manner of a bat or bird, or to change voluntarily the direction of their flight, or to fly beyond a very limited distance. Flying-fish are more frequently observed in rough weather and in a disturbed sea than during calms; they dart out of the water when pursued by their enemies or frightened by an approaching vessel, but frequently also without any apparent cause, as is also observed in many other fishes; and they rise without re-



gard to the direction of the wind or waves. The fins are kept quietly distended, without any motion, except an occasional vibration caused by the air whenever the surface of the wing is parallel with the current of the wind. Their flight is rapid, but gradually decreasing in velocity, greatly exceeding that of a ship going ten miles an hour, and covers a distance of 500 feet.

FLYING FOX, or more correctly FOX BAT, a name applied to a family of fruit-eating bats (*Pteropidæ*), found only in the Eastern hemisphere, and there confined to the tropical regions and Australia. It comprises nine genera and sixty-five species, a considerable proportion of which occur in the islands of the Malay Archipelago. They are also found throughout Africa, and extend northward and eastward to China and Japan, and southward to Tasmania. They are likewise included among the few indigenous mammals of the South Sea Islands, being found in Samoa and the Marianne islands.

FOG, or MIST, is the visible watery vapor sometimes hanging near the surface of the earth, and caused, as clouds are, by the precipitation of the moisture of the atmosphere. This takes place when a stratum of atmosphere comes in contact with a colder stratum, or with a portion of the earth's surface, as a hill, by which it is cooled, so that it can no longer hold in solution as much moisture as before. It takes place also when a cold stratum of atmosphere comes above a moist, warm portion of the earth's surface, the exhalations from which are precipitated and become visible as they ascend into it. Thus, fogs are formed over lakes, rivers, and marshes in the evening, because the water is then warmer than the atmosphere above it. The fogs seen in the morning often disappear by being dissolved in the atmosphere as the temperature increases. The fogs on the coasts of New England and Nova Scotia are caused by bodies of warm air wafted over cold water.

FOGARAS, the capital of a Hungarian county of the same name, in Transylvania, is situated on the left bank of the river Aluta, fifty-five miles east of Hermannstadt. Population (1890), 5,000.

FOGELBERG, BENEDICT ERLAND, a Swedish sculptor, was born at Gothenburg in 1786. His father, a copper-founder, encouraging an early exhibited taste for design, sent him in 1801 to Stockholm, where he studied at the school of art. In 1820 Fogelberg realized the dream of his life in visiting Rome, where the greater part of his remaining years were spent in the assiduous practice of his art and the careful study and analysis of the works of the past. He died suddenly of apoplexy at Trieste, December 22, 1854.

FOGGIA, a city of Italy, capital of the province of Capitanata, situated near the center of the great plain of Apulia, 122 miles by rail east-northeast of Naples.

FOIL, thin silvered sheet-copper, highly polished, and coated with mixtures of isinglass and transparent colors, is employed by jewelers to place at the back of paste and inferior stones, to improve their tints and luster. Copper foil, known also as Nuremberg or German foil, is made from thin hammered copper plates by beating between sheets of iron, boiling in solution of tartar and salt, drying, hammering, and lastly polishing with whiting on a convex smooth surface of copper.

FOIX, a town of France, capital of an arrondissement, and also of the department of Ariège, is situated on the left bank of the Ariège, in the gorge of a narrow valley at the foot of the Pyrenees, forty-four miles south of Toulouse. Population (1890), 6,000.

FOIX, COUNTS OF, an ancient French family which flourished from the eleventh to the sixteenth century. The title was first assumed by Roger, nephew of Peter Roger, count of Carcassonne, on his inheriting the town of Foix with the adjoining lands from his uncle. He

died in 1064, and was succeeded by his brother Peter, who died in 1070 and was succeeded by his eldest son, Roger II. This count was excommunicated by Pope Pascal II. for taking possession of ecclesiastical property, but in 1095 he took part in the crusade, and afterward by rich donations made his peace with the church. He died in 1125, and was succeeded by Roger III., who, on his death in 1141, was succeeded in 1188 by his only son, Raymond Roger, who, in 1190, accompanied Philip Augustus to the Holy Land, and distinguished himself at the capture of Acre. He was afterward engaged in the wars of the Albigenses, and on his being accused of heresy, Simon de Montfort was put in possession of his estates. He, however, made his peace with the church some time before his death, which took place in 1222 from exposure and fatigue at the siege of Mirepoix. This count was a patron of the Provençal poets, and reckoned himself one of their number. He was succeeded by his son, Roger Bernard II., surnamed the Great, who distinguished himself in the wars against the Albigenses, joined in an alliance against Louis VIII. of France, lost his lands, but succeeded in regaining them, was twice excommunicated but obtained absolution, and died in 1241 in the abbey of Bolbone, where he was for a short time a monk. Roger IV., his son and successor, did homage for his lands to the king of France and the count of Carcassonne. He died in 1265. His son and successor, Roger Bernard III., was more famous as a poet than a warrior. He was taken prisoner by Philip the Bold and again by Peter III. of Aragon; and before his death in 1302 began the quarrel of the house of Foix with that of Armagnac. His son and successor, Gaston I., continued the war, was excommunicated in 1308 by Clement V. and imprisoned in the Châtelet, Paris, but regaining his freedom shortly afterward, joined Louis X. in 1315 in the expedition against Holland, and died on the way home. To him succeeded his eldest son, Gaston II., who became reconciled with the house of Armagnac, joined the Navarrese in their wars against the Castilians, over whom he won a great victory at Tudela in 1335, took part in the war of the French against the English in 1337, and in 1343 assisted Alphonso XI. of Castile against the Moors. He died at Seville in September of the same year. His son Gaston III. (1331-1391), surnamed, on account of his beauty, Phœbus, was the most famous of the old Foix family. He took part in the wars against the English in 1345, and was on that account appointed by the king of France governor of Languedoc and Gascony. In 1346 he married Agnes of Navarre, but on account of a dispute with her brother, Charles the Bad, he divorced her in 1373. On suspicion of being concerned in a conspiracy in conjunction with his brother-in-law he in 1356 suffered a short imprisonment in the Châtelet. After obtaining his release he took part in the wars against the heretics of Prussia, and on his return in 1358 he assisted in releasing the royal princesses from the hands of the Jacquerie at Meaux. In the same year he recommenced the quarrels with the house of Armagnac, and took the count of Armagnac prisoner at the battle of Launac in 1372. In 1380 he was again appointed governor of Languedoc by Charles V., but that king dying the same year the regency replaced the count of Foix by the duke of Berry. Gaston defeated and slew the duke, but was afterward induced to resign his claims. In 1390 Gaston entertained Charles VI. in his castle of Mazères, and agreed for a sum of money to make him heir of his dominions. He died suddenly of apoplexy the same year when returning from the chase. Shortly after his death Charles VI. ceded the estate of Foix to Matthew, great-great-grandson of Roger I., who died without issue in 1398. On



his death his sister's husband, Archambault de Grailly, took possession of the estates, and in 1401 assumed the title. Dying in 1412 he was succeeded by his son, Jean de Grailly, who became governor-general of Languedoc, Auvergne, and Guienne, and, dying in 1436, was succeeded by his son, Gaston IV., who took part in the wars of Charles VII. against the English, and was raised to the peerage of France. Gaston's father-in-law, Jean II. of Navarre, declared him in 1455 his successor; and Louis XI. conferred on him the seignory of Carcassonne and the countships of Roussillon and Cerdagne. In 1471 he joined in a league against Louis, which, however, was rendered abortive by the death of the king's brother. On the death of Gaston, in 1472, the house of Foix became merged in that of Navarre.

FOIX, GASTON DE. See NEMOURS.

FOIX, PAUL DE, a French prelate and diplomatist, was born in 1528. He studied Greek and Roman literature at Paris, and jurisprudence at Toulouse, where shortly after finishing his curriculum, he delivered a course of lectures on civil law, which gained him great reputation. At the age of nineteen he was named councilor of the *parlement* of Paris. Having in this capacity expressed himself favorable to the adoption of mild measures in regard to certain persons accused of Lutheranism, he was arrested, but escaped punishment, and subsequently regained the favor of the French court. At the end of 1561 he was sent as ambassador to England, where he remained four years, and in 1565 endeavored in vain to persuade Elizabeth to consent to the surrender of Havre to the French. He was afterward sent to negotiate a marriage between Elizabeth and the duke of Anjou. On account of his former toleration of the Lutherans, Foix only with difficulty escaped perishing in the Massacre of St. Bartholomew in 1572; but having been sent in 1573 on an embassy to Italy, he was admitted to an audience of the pope, and succeeded in thoroughly establishing his reputation for orthodoxy. In 1576 he was made archbishop of Toulouse. He was afterward employed by the king of France on various important missions, and in 1579 was appointed ambassador to Rome, where he remained till his death in 1584.

FOKSHAN, or FOKSHANI, a town of Roumania, is situated 104 miles northeast of Bucharest on the river Milkov, which forms the boundary line between Wallachia and Moldavia—the larger portion of the town being in Wallachia.

FOLARD, JEAN CHARLES DE, a French writer on military tactics, was born at Avignon, February 13, 1669. His military ardor was first awakened by reading *Cæsar's Commentaries*, and became so strong that he twice made his escape from parental control, the second time being successful in obtaining the fulfillment of his wishes. When he joined the army he was only sixteen years of age, but the zeal with which he studied the scientific department of his profession soon brought him into notice, and in 1702 he became aide-de-camp to the duke of Vendôme, who was then in command of the French forces in Italy. For his services with the duke's brother in Lombardy in 1705 Folard received the cross of St. Louis, and in the same year he distinguished himself at the battle of Cassano, where he was severely wounded. In 1705 he defended Modena against Prince Eugene. He was dangerously wounded at the battle of Malplaquet, and a few months afterward was taken prisoner by the Austrians. In 1711 he was appointed governor of Bourbourg, and he afterward entered the service of Charles XII. of Sweden, and accompanied him in the invasion of Norway; but after the death of Charles he returned to France, and served as colonel in the Spanish campaign of the duke of Berwick. On the conclu-

sion of peace he applied himself with renewed diligence to the study of military tactics, and expounded his views in the following works:—*Nouvelles Découvertes sur la Guerre*, 1724; *Commentaries sur Polybe*, 1727; and *Fonctions et Devoirs d'un Officier de Cavalerie*, 1733. The system of column formation advocated by Folard, and many of his other opinions, have met with nothing but ridicule from tacticians; but Frederick the Great, while condemning his general system of tactics, nevertheless published an abridgment of his works, under the title of *Esprit du Chevalier Folard*, 1761, in the preface to which he expressed a high opinion of the sagacity of Folard's criticism of certain French generals, strongly recommended many of his tactical rules and methods of defense, and admitted that even in his most visionary plans hints were to be found very valuable and suggestive. Folard died at Avignon in 1752.

FOLDVÁR, or DUNA FÖLDVÁR (Danube Földvár), a town of Hungary in the county of Tolna, on the right bank of the Danube, forty-eight miles south of Buda.

FOLENGO, TEOFILO, otherwise known as Merlino Coccajo or Cocajo, one of the principal macaronic poets of the sixteenth century, was born of noble parentage at Cipada, near Mantua, November 8, 1491. From his infancy he showed great vivacity of mind, and a remarkable cleverness in making verses. His first publication was the *Merlini Cocaii Macaronicon*, which relates the adventures of a fictitious hero named Baldus. The coarse buffoonery of this work is often relieved by touches of genuine poetry, as well as by graphic descriptions and acute criticisms of men and manners. Its macaronic style is rendered peculiarly perplexing to the foreigner by the frequent introduction of words and phrases from the Mantuan patois. Though frequently censured for its occasional grossness of idea and expression, it soon attained a wide popularity, and within a very few years passed through several editions. Folen-go's next production was the *Orlandino*, an Italian poem of eight cantos, written in rhymed octaves. It appeared in 1526, and bore on the title-page the new pseudonym of Limerno Pitocco (Merlin the Beggar) da Mantova. In the same year, wearied with a life of dissipation, Folengo returned to his ecclesiastical obedience; and shortly afterward wrote his *Chaos del tri per uno*, in which, partly in prose, partly in verse, sometimes in Latin, sometimes in Italian, and sometimes in macaronic, he gives a veiled account of the vicissitudes of the life he had lived under his various names. We next find him about the year 1535 writing in rhymed octaves a life of Christ entitled *L'Umanità del Figliuolo di Dio*; and he is known to have composed, still later, another religious poem upon the creation, fall and restoration of man, besides a few tragedies. These, however, have never been published. Some of his later years were spent in Sicily under the patronage of Don Fernando de Gonzaga, the viceroy; he even appears for a short time to have had charge of a monastery there. In 1543 he retired to Santa Croce de Campesio, near Bassano; and there he died on December 9th in the following year.

FOLEY, JOHN HENRY, sculptor, R.A., was born at Dublin, May 24, 1818. He first appeared as an exhibitor in 1839, with his *Death of Abel* and *Innocence*. *Ino and Bacchus*, exhibited in 1840, gave him immediate reputation, and the work itself was afterward commissioned to be done in marble for the Earl of Ellesmere. Conceived entirely without classical or other affectation, this work has the charm of rare simplicity and grace. *Lear and Cordelia* and *Death of Lear* were exhibited in 1841, *Venus Rescuing Æneas* and *The Houseless Wanderer* in 1842, *Prospero and Miranda* in 1843. In 1844 Foley sent to the exhibition at Westminster Hall



his *Youth at a Stream*, and was, with Calder Marshall and John Bell, chosen by the commissioners to do work in sculpture for the decoration of the Houses of Parliament. Statues of John Hampden and Selden were executed for this purpose, and received liberal praise for the propriety, dignity, and proportion of their treatment. In 1849 he was made an associate and in 1858 a member of the Royal Academy; but although until his death his name remained on the list of Royal Academicians, he, after 1861, owing, it is said, to some misunderstanding with the hanging committee of that year, ceased not only to exhibit, but also to hold any communication with the body of which he was a member. He died at Hampstead of a pleuritic effusion after a short illness, preceded by a long indisposition, August 27, 1874, and was, on September 4th, buried in St. Paul's Cathedral.

FOLIGNO, or FULIGNO (ancient *Fulginium*), a town in the Italian province of Perugia, is situated in a beautiful and fertile valley on the Topino, twenty miles southeast of Perugia by railway.

FOLKES, MARTIN, an eminent English antiquary, was born at London, October 29, 1690. At the age of seventeen he entered at Clare College, Cambridge, where he distinguished himself so much in mathematics that when only twenty-three years of age he was chosen a fellow of the Royal Society. He was elected one of the council in 1716, and in 1723 Sir Isaac Newton, president of the society, appointed him one of the vice-presidents. On the death of Newton he became a candidate for the presidency, but the higher standing and superior influence of the other candidate, Sir Hans Sloane, carried the election against him. In 1733, he set out on a tour through Italy, in the course of which he found opportunity of consulting the best furnished cabinets of that country, and composed his admirable *Dissertations on the Weights and Values of Ancient Coins*, which he read before the Society of Antiquaries. Before the same society he read, in 1736, his *Observations on the Trajan and Antonine Pillars at Rome*, and also communicated his *Table of English Gold Coins from the eighteenth year of King Edward III., when gold was first coined in England, to the present time, with their Weights and Intrinsic Values*. In 1745 he printed this work along with another on the history of silver coinage. He also contributed both to the Society of Antiquaries and to the Royal Society various other papers, chiefly on Roman antiquities, which were published in their transactions. He died in 1754.

FOLKESTONE, or FOLKSTONE, a municipal borough, seaport, and market-town of England, county of Kent, is situated on the London and Southeastern Railway, seven miles west-southwest of Dover.

FOLK-LAND, or FOLC-LAND, in early English law was the land belonging to the community at large—the *ager publicus*—as distinguished from *boc-land*, or land granted to individuals in private ownership. The conception of the land as primarily belonging to the nation or tribe, appears to be universal in early civilization. As civilization advances the rights of individuals emerge and increase in importance until, as in England at the present day, the original conception has entirely disappeared.

FOLK-LORE. This word, formed in imitation of such German compounds as "Volksepos," "Volksfest," "Volkslied," has recently become current in the English language as a convenient though somewhat vague general heading under which to arrange all that has been observed or recorded of the traditions current among the "common people" of different countries, civilized or uncivilized, whether

in ancient, mediæval, or modern times. Each nation and each locality has, of course, a "folk-lore," as it has a language; and it is obvious that to set forth any given folk-lore, with all its stratifications, in a comprehensive and orderly way, would virtually be equivalent to exhibiting fully the past and present intellectual, moral, religious, and social condition of the people to whom it belonged. An exhaustive account of the folk-lore of the world would be equivalent to a complete history of the thoughts of mankind.

The eccentricities of traditionary story and traditionary practice have always been found a more or less interesting and amusing study by the contemplative observer of human nature; and almost all travelers and historians, from Herodotus downward, have occasionally condescended to add something to the general collection of curiosities in that department. But to make a thorough investigation of the "vulgar antiquities" of any country, and especially of one's own, was, until very recently, regarded as childish and useless. An exception, indeed, was made in favor of the folk-lore of ancient Greece and Rome, as being intrinsically beautiful and exceptionally instructive. But the very fact that these had been beautified by artistic treatment impaired their usefulness from the purely antiquarian point of view; and in any case the floating traditions of Attica and Latium were too few, too fragmentary, and gathered from too narrow an area to furnish adequate data for the anthropologist and the sociologist. Here, as in so many other instances, it was necessary that men should greatly extend the area of their investigations before they could rightly understand that which alone they were curious to know.

It was in Germany that the study of folk-lore first entered upon its scientific stage. One of the earliest symptoms of the awakening of a wider and more sympathetic interest in the various products of a nation's mind, its legends and its tales, its manners and its customs, its laws, government, religion, and daily life, was the appearance in 1778-9 of Herder's celebrated collection of popular songs. But the new day was fairly ushered in by the successive publications of the brothers Grimm, more particularly of the *Kinder- und Haus-Mährchen* in 1812, and of the *Deutsche Mythologie* in 1835. The latter work, which was closely dependent on the former, showed for the first time what results may be hoped for by an intelligent investigator, if only, laying aside all prejudice, he will put himself to the trouble of collecting largely and widely, and of interpreting faithfully and rationally, a nation's oral traditions and unwritten customs. It was seen that, although many relics of the past had been irrecoverably lost, enough had been preserved to furnish conclusive proof of the oneness in faith as well as in speech of the Teutonic race, and also to give indications, in many instances, of the precise points at which the divergences had occurred. This new knowledge, derived to a large extent from the skillful use of folk-lore "collected from the mouths of old women in the spinning-rooms of German villages," acquired an altogether peculiar interest and importance from the other discovery by which the philological labors of Bopp and others had been crowned—the discovery, namely, of the original unity of all the Aryan races, and the demonstration of the fact that the Teutons themselves were but one branch of a greater family, including Hindus and Celts, which had at one time inhabited the central plain of Asia, and before dispersing eastward and westward, had developed an ineffaceably characteristic speech, civilization, and religion. The identification verbally of Dyaus, Zeus, Tiw, Zio, and Tyr was followed, as investigation proceeded, by the identification really of many of the strange forms in



which religious sentiment had found expression; and comparative mythology became an inseparable companion of comparative philology. (See MYTHOLOGY and PHILOLOGY.) It was thenceforward obvious that every mythology, in the Aryan family at least, however puerile or absurd it might at first sight appear, was a fit subject for scientific investigation, and capable of yielding scientific results. The problem in each case was to trace the nursery tale to the legend, and the legend to the myth, and the myth to its earliest germ, and as far as possible to indicate the foreign interpolations when they occurred, and account for the local accretions. In this way the history of a story, like the history of a word, was frequently found to be more interesting and more instructive than the history of a campaign. Once this had been realized, the new field of folk-lore found many skilled laborers; and the quantity of material available for examination and classification rapidly increased. Each fresh comparison made it increasingly plain that in groundwork and plot the stories current among the Indo-European peoples were substantially identical. The reader of the fables of La Fontaine found nothing essentially and absolutely strange in the Pankatantra or Hitopadesa; the Indian ayah was discovered to have unmistakably the same stock of stories as the German, Norwegian, or Celtic nurse. In a few cases, indeed, it could be shown that the wide diffusion of some particular fable was attributable to migrations which had taken place within the historic period; and in other cases it could hardly be doubted that certain very remarkable coincidences were still mere coincidences, and nothing more; but in a great majority of instances, it was plain that the notion of borrowing or copying having occurred was inadmissible, and that nothing could account for their constant similarity except the theory of a common origin. They were "primitive or organic legends, representing one common ancient stratum of language and thought reaching from India to Europe;" the others were secondary or inorganic, consisting of "bowlders of various strata carried along by natural and artificial means from one country to another."

The aboriginal Aryan legends may be arranged under one or other of two categories, the myth or the fable. That primitive fables actually exist, stories expressly invented for a moral or didactic purpose, seems a well-established fact. The fable of the King and the Bee, for example, crops up alike in India, in Greece, and in Norway, in forms that cannot be accounted for by direct oral or literary transmission; and it would seem that the story of the Master-thief, which is to be met with in Hisopadesa, in Herodotus, in the *Tales of the Alhambra*, and which is current in Norway and also in the Western Highlands of Scotland, must probably also be regarded as embodying at least a fable-germ. The organic fables, however, are not so numerous as the organic myths—those stories, that is to say, which, whether based on mistaken metaphor or distorted history, are at least the product of the unconscious play of fancy. The same characters and the same incidents constantly recur under innumerable names and shapes. "The story of the heroes of Teutonic and Hindu folklore, the stories of Boots and Cinderella, of Logedas Rajah and Surya Bai, are the story also of Achilles and Oidipous, of Perseus and Theseus, of Helen and Odysseus, of Baldur, and Rustem, and Sigurd. Everywhere there is the search for the bright maiden who has been stolen away, everywhere the long struggle to recover her. The war of Ilion has been fought out in every Aryan land." What we are accustomed to associate with the name of William Tell is told of many archers under other names, in England (William of Cloudsle), Germany, Denmark, Norway, Iceland, and Lapland; the

same story of the young hero dying in the fullness of youth is told of Baldur and Isfendiyar, Sifrit, and Achilles. The stories vary widely under the influence of climate, religion, and civilization, and yet remain substantially the same. The sun-myth, when transferred from southern to northern latitudes, cannot but undergo some change of shape; the *dramatis persona* are as various in each fable as the fauna and flora of the regions in which it is told. Odin, when no longer recognized as a deity, becomes simply the wild huntsman of Hellequin; when civilization makes even such a being no longer credible, he still survives possibly as Harlequin or Robin Hood.

Hitherto the systematic study of comparative folklore has been almost inclusively confined within Aryan limits. But the successful application of scientific method in that field has encouraged many laborers in other regions, and an amount of material is being accumulated which may be expected ultimately to yield very important results in ethnology and anthropology. So far as the savage tribes of the world are concerned, it would seem that the greater proportion of trustworthy data is to be derived from that department of their "folk-lore," which manifests itself in traditional practices; but in no case, indeed, can the comparative mythologist afford to overlook the qualifying or corroborative evidence supplied by what may be called comparative "ethnology." Every custom has an instructive history if we can but succeed in interpreting its lore. In ascertaining when, where and how any given tribe came first to worship plants, or animals, or ghosts, we get definitely nearer the solution of the fundamental problem of anthropology. Even the modern usages of social and domestic life, the observances that accompany such incidents as marriage, birth and death, when skillfully read, are capable of telling us something at least of the condition of primitive man. (See ANTHROPOLOGY, ANIMISM, DEMONOLOGY, FIRE, FUNERAL RITES, MARRIAGE, etc.)

FOLLEN, AUGUST (or, as he afterward called himself, ADOLF) LUDWIG, a German poet, was born at Giessen in Hesse-Cassel, January 21, 1794. He studied theology at Giessen and law at Heidelberg, and after leaving college edited the *Elberfeld Allgemeine Zeitung*. For connection, real or supposed, with some radical plots, he was imprisoned for two years at Berlin. When released in 1821, he went to Switzerland, where he taught in the canton school at Aarau, farmed from 1847 to 1854 the estate of Liebenfe's in Thurgau, and then retired to Bern, where he lived till his death (December 26, 1855).

FOLLEN, CHARLES, brother of the preceding, was born at Romrod, in Hesse-Darmstadt, September 4, 1796. He studied theology and law at Giessen, where he acted for some time as privat docent. His liberal sentiments and writings, and the part he took in the defense of popular rights, made him obnoxious to the government of his own province. He accordingly went to Jena to lecture there, but the assassination of Kotzebue by Sand happened almost immediately after his arrival, and the government believed or affected to believe that Follen was an accomplice. The inquiries that were made conclusively proved his innocence, but notwithstanding this he found it necessary to remove to Switzerland, where he taught in the cantonal school of the Grisons at Chur, and at the university of Basel. While thus engaged the Prussian Government demanded his surrender as a political prisoner. Twice the Government of Basel refused, but the third request was so peremptory that they were unwillingly preparing to comply, when Follen saved himself by a hurried flight. In the beginning of 1825 he arrived in the United States, and was employed for the next ten years in



teaching ecclesiastical history, ethics, and the German language and literature at Harvard college. He then acted as Unitarian clergyman at New York and East Lexington. He perished, along with 175 fellow-travelers, at the burning of the steamship *Lexington*, in Long Island Sound, January 13, 1840. Follen was the author of several very celebrated and popular songs written in the interests of liberty. The best is perhaps the *Bundeslied*, beginning "Brause du Freiheitssang." It is certainly one of the most spirited odes in modern German lyric poetry. While in America Follen wrote a German grammar and reader. His wife, Eliza Lee (1787-1860), an American authoress of some reputation, published after his death his lectures and sermons, with a biography written by herself (5 vols., Boston, 1841).

FOLLETT, SIR WILLIAM WEBB, attorney-general of England, was born at Topsham in Devonshire, December 2, 1798. In 1818 he took his degree of B.A. without academical honors, and the same year settled in London, becoming a pupil of Godfrey Sykes and Robert Bayley, two of the most eminent special pleaders of the day. He began to practice as a pleader below the bar in 1821, was called to the bar in 1824, and joined the western circuit in 1825. At the very outset his great qualifications were recognized, and his rapid rise was assured. Under the first administration of Sir Robert Peel, Follett was appointed solicitor-general (November, 1834), but resigned with the ministry in April, 1835. In the course of this year he was knighted. On the return of Peel to power in 1841 Sir William was again appointed solicitor-general, and in April, 1844, he succeeded Sir Frederick Pollock as attorney-general. But his health, which had begun to fail him in 1838, and had been permanently injured by a severe illness in 1841, now broke down, and he was compelled to relinquish practice and to visit the south of Europe. He returned to England in March, 1845; but the disease, consumption, reasserted itself, and he died in London June 28th, following.

FONBLANQUE, ALBANY WILLIAM, was descended from a noble French Huguenot family, the Greniers of Languedoc. The titles of Comte de Hautserre et de Fonblanque were conferred by Henry IV. on the sons of the famous Sicur Pierre de Grenier, known in history by his gallant defense of the castle of Cessenan against the Duc de Montmorenci in 1584. After the revocation of the edict of Nantes, the Greniers underwent severe persecutions on account of their devotion to the Huguenot cause; and in 1740, Abel de Grenier, Comte de Fonblanque, sent his two sons, Antoine and Jean, to England that they might be educated in the Protestant faith. John became naturalized in England under the name of Fonblanque; and his son, John Samuel Martin Fonblanque, a distinguished equity lawyer, and the author of a standard legal work, a *Treatise on Equity*, became the father of the most brilliant journalist of his day. The father of Albany Fonblanque was, like his son, a stanch Liberal; he represented the borough of Camelford in parliament; and throughout his career was remarkable for the integrity and courage, as well as for the ability, with which he supported Liberal principles.

The subject of the present notice was born in London in 1793. At fourteen he was sent to Woolwich to prepare for the Royal Engineers. At the age of nineteen (1812) he commenced writing for the newspapers, and very soon attracted notice both by the boldness and liberality of his opinions, and by the brilliancy of his style. From 1820 to 1830 Albany Fonblanque was successively employed upon the staff of the *Times* and the *Morning Chronicle*, whilst he contributed to the *Examiner*, to

the *London Magazine*, and to the *Westminster Review*. In 1828 the *Examiner* newspaper, which had been purchased by the Rev. Dr. Fellowes, the learned and amiable author of the *Religion of the Universe*, etc., was given over to Fonblanque's complete control; and for a period of seventeen years (1830 to 1847) he not only sustained the high character for political independence and literary ability which the *Examiner* had gained under the direction of Leigh Hunt and his brother John Hunt, but even compelled his political opponents to acknowledge a certain delight in the boldness and brightness of the wit directed against themselves. During his connection with the *Examiner*, Fonblanque had many advantageous offers of further literary employment; but he devoted his energies and talents almost exclusively to the service of the paper he had resolved to make a standard of literary excellence in the world of journalism. Fonblanque was offered the governorship of Nova Scotia; but although he took great interest in colonial matters, and had used every effort to advocate the more generous political system which had colonial self-government for its goal, he decided not to abandon his beloved *Examiner* even for so sympathetic an employment. In 1847, however, domestic reasons induced him to accept the post of Statistical Secretary of the Board of Trade. This of course compelled him to resign the editorship of the *Examiner*, but he still continued to contribute largely to the paper, which, under the control of John Forster, continued to sustain its influential position. During the latter years of his life, Fonblanque took no prominent part in public affairs; and when he died at the age of seventy-nine (1872) he seemed, as his nephew rightly observes, "a man who had lived and toiled in an age gone by and in a cause long since established."

FOND DU LAC, a flourishing city, the capital of Fond du Lac county, Wis., is beautifully situated on a rising ground at the southern end of Lake Winnebago, sixty-three miles northwest of Milwaukee. Railways radiate from it in various directions, and its situation on Winnebago lake gives it access to a wide district of inland navigation. It has a considerable shipping trade in wood, hay and cattle, and possesses a large tannery, foundries, saw-mills, cigar factories, carriage and wagon factories, and railway-car factory. Population (1890), 12,024.

FONDI, the ancient *Fundi*, a town of Italy in the province of Caserta, about eleven miles northwest of Gaëta.

FONT, the vessel used in churches to hold the water for Christian baptism.

FONTAINE, JEAN DE LA. See LA FONTAINE.

FONTAINE, PIERRE FRANÇOIS LÉONARD, French architect, was born at Pontoise, September 20, 1762. In October, 1779, he was sent to Paris to study in the school of Peyre the younger, and there began his acquaintance with Percier, which ripened into a life-long friendship. After six years of study he competed for a prize at the academy, and, winning the second, received a pension and was sent to Rome (1785). Percier accompanied him. The Revolution breaking out soon after his return to France, he took refuge in England; but after the establishment of the consulate, he was employed by Bonaparte to restore the palace of Malmaison. Henceforth he was fully engaged in the principal architectural works executed in Paris, as architect successively to Napoleon I., Louis XVIII., and Louis Philippe. In conjunction with Percier (till his death) he was employed on the Arch of the Carrousel, the restoration of the Palais-Royal, the grand staircase of the Louvre, and the works projected for the union of the Louvre and the Tuileries. In 1812 he was



admitted a member of the Academy of Fine Arts, and in 1813 was named first architect to the emperor. Fontaine lost his friend and associate Percier, in 1838, and died himself at Paris, October 10, 1853.

FONTAINEBLEAU, a town of France, at the head of an arrondissement, in the department of Seine-et-Marne, about 37 miles S.E. from Paris on the railway to Lyons. In the immediate vicinity of the town is the celebrated palace of Fontainebleau—one of the largest, and in the interior one of the most sumptuous, of the royal residences of France. The origin of the name and the building are equally unknown; but the old manor-house was used by Louis VII. in the latter part of the twelfth century, and continued a favorite residence of Philip Augustus and St. Louis. The existing edifice was begun by Francis I., who laid out immense sums of money in its erection, employing Primaticcio, a famous Italian architect, to draw the plans, and commissioning Leonardo da Vinci, Andrea del Sarto, and Benvenuto Cellini to expend the resources of their arts in making it a truly royal residence. Henry IV. doubled the area of the buildings and gardens, adding among other portions the great Diana gallery, the Court of the Princes, and the Galerie des Cerfs. A canal which he constructed was afterward filled up by Louis XIV. With Louis XV. the palace fell into disfavor, and for a time it was used as a military school. Napoleon I. restored it with great splendor, at a cost of six million francs, and often resided in it; but after the return of the Bourbons it was again allowed to fall into disrepair. Louis XVIII. and Louis Philippe both did somewhat to its restoration. The congeries of buildings is very extensive, the roofing, it is said, covering no less than fourteen acres. There are five great courts, distinguished as the Court of the White Horse, the Court of the Fountain, the Oval or Donjon Court, the Court of Princes, and the Court of the Kitchens or of Henry VI. The first is also called the Court of Adieu in memory of the parting scene between Napoleon and his Old Guard in 1814, at the foot of the Horse Shoe staircase. The chapel of the Holy Trinity was built under Francis I., and the chapel of St. Saturnin dates from the same period, and occupies the site of an older building which was consecrated by Thomas à Becket. It is impossible to do more than mention a few of the historical events which have taken place at Fontainebleau. Philip the Fair, Henry III., and Louis XIII. were all born in the palace, and the first of these kings died there. James of Scotland was there received by his intended bride; and Charles V. of Germany was entertained there in 1539. Christina of Sweden lived there for years, and the gallery is still shown where she caused her secretary, Monaldeschi, to be murdered, or, as she regarded it, executed. In 1685 Fontainebleau saw the signing of the revocation of the edict of Nantes, and in the following year the death of Condé. In the eighteenth century it had two illustrious guests in Peter the Great of Russia and Christian VII. of Denmark; and in the early part of the nineteenth it was twice the residence of Pius VII.,—in 1804, when he came to consecrate the emperor, and in 1812–1814, when he was that emperor's prisoner. It was within its walls that the sentence of divorce was passed against Josephine. The forest of Fontainebleau is one of the most beautiful wooded tracts in France, and for generations it has been the chosen haunt of French landscape painters. The most celebrated spots are the Vallée de la Solle, the Gorge au Loup, the Gorge d'Apremont, and the Fort l'Empereur. The whole area extends to 81,740 acres, and it is traversed by 12,000 miles of road and pathway.

FONTANA, DOMENICO, Italian architect and mechanician, was born at Mili, a village on the lake of

Como, in 1543. After a good training in mathematics, he went, in 1563, to join his elder brother, then studying architecture at Rome. He made rapid progress, and was taken into the service of Cardinal Montalto, for whom he erected a chapel in the church of Santa Maria Maggiore and the Villa Negroni. When the cardinal's pension was stopped by the pope, Gregory XIII., Fontana volunteered to complete the works in hand at his own expense. The cardinal being soon after elected pope, under the name of Sixtus V., he immediately appointed Fontana his chief architect. Among the works executed by him were the Lateran Palace, the palace of Monte Cavallo (the Quirinal), the Vatican Library, etc. But the undertaking which brought Fontana the highest repute was the removal of the great Egyptian obelisk, brought to Rome in the reign of Caligula, which was lying in the circus of the Vatican, and its erection in front of St. Peter's. This he accomplished in 1586. After the death of Sixtus V., charges were brought against Fontana of misappropriation of public moneys, and Clement VIII. dismissed him from his post (1592). This appears to have been just in time to save the Colosseum from being converted by Fontana into a huge cloth factory, according to a project of Sixtus V. Fontana was then called to Naples, and accepted the appointment of architect to the viceroy, the count of Miranda. At Naples he built the royal palace, constructed several canals, and projected a new harbor and bridge, which he did not live to execute. The only literary work left by this architect is his account of the removal of the obelisk, 1589. He died at Naples in 1607, and was honored with a pompous funeral in the church of St. Ann.

FONTANA, LAVINIA (1552–1614), daughter of Prospero (see below), was a painter of no little fame, especially in portraits. She was greatly employed by the ladies of Bologna, and, going thence to Rome, painted the likenesses of many illustrious personages, being under the particular patronage of the family (Buoncampagni) of Pope Gregory XIII., who died in 1585. The Roman ladies, from the days of this pontiff to those of Paul V., elected in 1605, showed no less favor to Lavinia than their Bolognese sisters had done; and Paul V. was himself among her sitters. Some of her portraits, often lavishly paid for, have been attributed to Guido. In works of a different kind also she united care and delicacy with boldness. Among the chief of these are a Venus in the Berlin museum; the Virgin lifting a veil from the sleeping infant Christ, in the Escorial; and the Queen of Sheba visiting Solomon. Her own portrait in youth—she was accounted very beautiful—was perhaps her masterpiece; it belongs to the Counts Zappi of Imola, the family into which Lavinia married. She is deemed on the whole a better painter than her father; from him naturally came her first instruction, but she gradually adopted the Caraccesque style, with strong quasi-Venetian coloring. She was elected into the Academy of Rome, and died in that city in 1614.

FONTANA, PROSPERO, a painter, was born in Bologna, and became a pupil of Innocenzo da Imola. He afterward worked for Vasari and Pierino del Vaga. It was probably from Vasari that Fontana acquired a practice of off-hand, self-displaying work. He undertook a multitude of commissions, and was so rapid that he painted, it is said, in a few weeks, an entire hall in the Vitelli Palace at Città di Castello. Along with daring, he had fertility of combination, and in works of parade he attained a certain measure of success, although his drawing was incorrect, and his mannerism palpable. He belongs to the degenerate period of the Bolognese school, under the influence chiefly of the imitators of



Raphael – Sabbatini, Sammachini, and Passerotti being three of his principal colleagues. His soundest successes were in portraiture, in which branch of art he stood so high that toward 1550 Michelangelo introduced him to Pope Julius III. as a portrait-painter; and he was pensioned by this pope, and remained at the pontifical court with the three successors of Julius. Here he lived on a grand scale, and figured as a sort of arbiter and oracle among his professional brethren. Returning to Bologna, he opened a school of art, in which he became the preceptor of Lodovico and Agostino Caracci; but these pupils, standing forth as reformers and innovators, finally extinguished the academy and the vogue of Fontana. His subjects were in the way of sacred and profane history and of fable. He left a large quantity of work in Bologna — the picture of the Adoration of the Magi, in the Church of S. Maria delle Grazie, being considered his masterpiece — not unlike the style of Paul Veronese. His death took place in Rome in 1597.

FONTANES, LOUIS, MARQUIS DE, French poet and politician, was born at Niort, in Poitou, March 6, 1757. He was a descendant of a noble Protestant family of Languedoc, banished by the revocation of the edict of Nantes, but afterward converted to the Catholic faith and restored to their native land. Having completed his education at the college of Niort, he went in 1777, after the death of his father and brother, to Paris. He had already made several attempts in verse; and in 1778 he published a short descriptive poem entitled *La Forêt de Navarre*. This procured him the notice and friendship of Ducis, and he was encouraged to persevere.

Compelled to leave Paris after the death of the king, he withdrew to Lyons, where he married, and remained till the arrival of Collot d'Herbois, in 1793. Driven again to lead a wandering life, he displayed at once his literary power, his patriotism, and his intrepidity in the eloquent petition on behalf of the Lyonnese victims of Collot d'Herbois and his colleagues, which was presented to the convention in December of that year. For this bold appeal he was proscribed, and he owed his protection in concealment to the friendship of Madame Dufresnoy. After the fall of Robespierre, Fontanes was appointed professor of belles lettres at the central school, and admitted a member of the Institute. About the same time he was associated with La Harpe in the conduct of the *Mémorial*. For one of his articles he was condemned to banishment by the Directory and expelled from the Institute. He escaped to England, and there renewed his acquaintance with Châteaubriand, also an exile. Returning to France after the eighteenth Brumaire, he was soon after commissioned by the first consul to write the funeral oration on Washington, and this opened a new chapter in his life. Bonaparte, satisfied with the *Éloge*, admitted Fontanes to frequent intercourse with him; he was soon reinstated at the Institute, and became a member of the legislative body, of which, in 1804, he was made president. He was also one of the first members of the Legion of Honor; and, in 1808, he was made grand master of the university. Fontanes was censured by the republican party for alleged servility to the emperor, but apparently without reason. He was created count, and in 1810 was called to the senate. He voted for the deposition of Napoleon, retained his offices under the provisional government, and was made a peer by Louis XVIII. In February, 1815, the post of grand master of the university was suppressed, and Fontanes was promoted grand cordon of the Legion of Honor. He remained passive during the Hundred Days, and, after the second restoration of the Bourbons, was made a private councilor.

The title of marquis was conferred on him in 1817. In January, 1821, he was chosen president of the Société des Bonnes Lettres; but his health had long been declining, and he died at Paris on March 17th of that year.

FONTENAY-LE-COMTE, the chief town of an arrondissement in the department of Vendée, France, is situated on both sides of the river Vendée at the point where it becomes navigable, thirty-five miles southeast of La Roche sur-Yon (Napoléon Vendée).

FONTENELLE, BERNARD LE BOVIER DE, author of the *Dialogues des Morts*, *Entretiens sur la Pluralité des Mondes*, etc., was born at Rouen on February 11, 1657, and died at Paris on January 9, 1757, having thus very nearly attained the age of 100 years. His attention was first directed to poetical composition; and more than once he competed for the poetry prizes of the French Academy, but never with success. He had also the sorrow of witnessing, in 1680, the total failure of his tragedy *Aspar*, a failure which was all the more mortifying because, for the purpose of annoying Racine, Thomas Corneille had previously sounded forth in the *Mercur* the praises of his nephew as the most gifted of all the younger dramatists. Fontenelle afterward acknowledged the justice of the public verdict by burning his unfortunate drama, of which nothing but the name now survives. But for several years he persisted in the belief that poetry was his true vocation, and continued to produce dramatic compositions, the mediocrity of which, considering the author's real talent, is positively astonishing. His opera of *Thétis et Pélée*, though highly praised by Voltaire, cannot be said to rise much above the others; and it is significant that of all his dramatic works, not one has kept the stage. His *Poésies Pastorales* have no greater claim to permanent repute, being characterized by stiffness and affectation; and the utmost that can be said for his poetry in general is that it displays much of the *limæ labor*, great purity of diction, and occasional felicity of expression. It was by his *Dialogues des Morts*, published in 1683, that Fontenelle first established a genuine claim to high literary rank; and that claim was very much enhanced three years later by the appearance of the *Entretiens sur la Pluralité des Mondes*, a work which was among the very first to illustrate the possibility of being scientific without being either uninteresting or unintelligible to the ordinary reader. It was precisely the kind of work which Fontenelle was capable of executing well, both from the natural bent of his intellect and from the course of his previous studies. His object was to popularize among his countrymen the astronomical theories of Descartes; and it may well be doubted if that philosopher ever ranked a more ingenious or successful expounder among the number of his disciples. Hitherto Fontenelle had continued to reside in Rouen, but in 1687 he removed to Paris for permanent residence there; and in the same year he published his *Histoire des Oracles*, a book which made a considerable noise in the theological as well as in the philosophical world. It was not so much an original work as a reduction from the Latin of Van Dale, and consisted of two essays, the first of which was designed to prove that oracles were not given by the supernatural agency of demons, and the second, that they did not cease with the birth of Christ. The clearness and precision of the style, and the smooth flow of the reasoning in this treatise, have been always much admired. It excited the suspicion of the church, however, and a Jesuit, by name Baltus, published a ponderous refutation of it; but the peace-loving disposition of its author impelled him to leave his opponent unanswered. He was too busy, he wrote to Leclerc, and added, "Enfin, je n'ai point du tout l'humeur polémique, et toutes les querelles me déplaisent. J'aime mieux



que le diable ait été prophète, quisque le père jésuite le veut, et qu'il croit cela plus orthodoxe." To the following year (1688) belongs his *Digression sur les Anciens et les Modernes*, in which he took the modern side in a somewhat unnecessary controversy then raging; his *Doutes sur le Systeme Physique des Causes Occasionelles* (against Malebranche) appeared shortly afterward. In 1691 he was received into the French Academy in spite of the determined efforts of Racine and Boileau, who on four previous occasions had secured his rejection. He subsequently was admitted a member both of the Academy of Inscriptions and of the Academy of Sciences; and in 1699 he became perpetual secretary to the latter body. This office he actually held for the long period of forty-two years; and it was in this official capacity that he wrote the *Histoire de l'Académie des Sciences*, containing extracts and analyses of the proceedings, and also the *Éloges* of the members.

FONTEVRAULT, or FONTEVRAUD, in Latin *Fons Ebraaldi*, a town of France, with a population of about 2,500, in the department of Maine-et-Loire, ten miles southeast of Saumur, and two miles from the confluence of the Loire and Vienne.

FOOCHOW. See FUH-CHOW.

FOOD. See DIETETICS.

FOOL. The class of fools, buffoons, or jesters, which reached its culminating point of influence and recognized place and function in the social organism during the Middle Ages, appears to have existed in all times and countries. Not only have there always been individuals naturally inclined and endowed to amuse others; there has been besides in most communities a defined class, the members of which have used their powers or weaknesses in this direction as a regular means of getting a livelihood. Savage jugglers, medicine-men, and even priests, have certainly much in common with the jester by profession. There existed in ancient Greece a distinct class of professed fools whose habits were not essentially different from those of the jesters of the Middle Ages. Of the behavior of one of these, named Philip, Xenophon has given a picturesque account in the *Banquet*. Philip of Macedon is said to have possessed a court fool, and certainly these (as well as court poets and court philosophers, with whom they have sometimes been not unreasonably confounded) were common in a number of the petty courts at that era of civilization. *Scurra* and *moriones* were the Roman parallels of the mediæval witty fool; and during the empire the manufacture of human monstrosities was a regular practice, slaves of this kind being much in request to relieve the languid hours. The jester again has from time immemorial existed at eastern courts. Witty stories are told of Bahalul, the jester of Haroun Al Raschid, which have long had a place in Western fiction. On the conquest of Mexico, court fools and deformed human creatures of all kinds were found at the court of Montezuma. But that monarch no doubt hit upon one great cause of the favor of monarchs for this class when he said that "more instruction was to be gathered from them than from wiser men, for they dared to tell the truth." Mr. Douce, in his essay *On the Clowns and Fools of Shakespeare*, has made a ninefold division of English fools, according to quality and place of employment, as the domestic fool, the city or corporation fool, the tavern fool, the fool of the mysteries and moralities. The last is generally called the "vice," and is the original of the stage clowns so common among the dramatists of the time of Elizabeth, and who embody so much of the wit of Shakespeare. A very palpable classification is that which distinguishes between such creatures as were

chosen to excite to laughter from some deformity of mind or body, and such as were so chosen for a certain (to all appearance generally very shallow) alertness of mind and power of repartee—or briefly, butts and wits. The dress of the regular court fool of the Middle Ages was not altogether a rigid uniform. To judge from the prints and illuminations which are the sources of our knowledge on this matter, it seems to have changed considerably from time to time. The head was shaved, the coat was motley, and the breeches tight, with generally one leg different in color from the other. The head was covered with a garment resembling a monk's cowl, which fell over the breast and shoulders, and often bore asses' ears, and was crested with a cockscomb, while bells hung from various parts of the attire. The fool's bauble was a sort of staff bearing a ridiculous head, to which was sometimes attached an inflated bladder, by means of which sham castigations were effected. A long petticoat was also occasionally worn, but seems to have belonged rather to the idiots than to the wits.

The fool's business was to amuse his master, to excite him to laughter by sharp contrast, to prevent the over-oppression of state affairs, and, in harmony with a well-known physiological precept, by his liveliness at meals to assist his lord's digestion. The names and the witticisms of many of the official jesters at the courts of Europe have been preserved by popular or state records.

FOOTBALL is a game which consists, as the name implies, in giving motion to a ball with the feet alone. The ball requires to be larger than in all handball pastimes, in order that it may be easily kicked. This was accomplished in ancient times by inflating a bladder or skin termed *follicis*. There are now two varieties of game in vogue—the Rugby game and the association game—both of English origin.

Football has extended most rapidly during the past few years, as is evinced by the fact of all large towns, villages and schools now possessing football clubs. It is a game more adapted to youths than to middle-aged persons, and should not be indulged in after the frame is full-grown and set, when the tumbles and scrimmages incidental to the Rugby code are apt to be baneful. The balls are now made of inflated india-rubber bladders, covered with strong leather laced together, the Rugby balls being elliptical or egg-shaped, and the Association ones a perfect sphere.

The two games may be briefly described thus:—

Under the Rugby code a level piece of turf is the scene of action, and fifteen a side the usual number of players—ten "forward," two "half backs," one "three-quarters back," and two "backs." Each goal is composed of two upright posts, exceeding eleven feet in height, and placed eighteen and one-half feet apart, with a cross-bar ten feet clear from the ground. The choice of goals is decided by lot, the side which wins the choice either availing themselves of any favorable breeze or gradients which may prevail, or electing to play at a disadvantage for the first period of the game till "half time" is called. The game is commenced by the opposite side to that which has choice of goals kicking off the ball (placed on the ground) from midway between the goals. The object of both sides then is to drive the ball over the cross-bar, and between the line of the two upright posts of their opponents' goal, which achievement constitutes "obtaining a goal." This can be accomplished either by a player's touching the ball down behind his adversaries' goal line, then carrying it out, and thus obtaining a "try" or place kick at goal, or by kicking a goal with a direct drop kick instantly the ball rebounds from the ground. A



match is decided by a majority of goals; if their number be equal, by a majority of ties; and if none of either be obtained, the match is drawn. The other minutiae are so numerous that no less than sixty rules are required for their regulation.

The intricacies of the Association game are far fewer, and only require a very plain set of thirteen rules. No handling or touching the ball, except by the goal-keeper, is permissible, "dribbling" or kicking with the feet being the sole mode of propulsion. The goal posts are twenty-four feet apart, and the cross-bar only eight feet from the ground, the ball in this case having to be driven *under* the latter in order to obtain a goal. "Tries" are unknown, and the gaining of goals are the sole points whereby the game is decided.

FOOTE, SAMUEL, comic dramatist and actor, was born at Truro about the year 1720. Of his attachment to his native Cornwall he gives no better proofs as an author than by making the country-booby Timothy (in *The Knights*) sound the praises of that county and of its manly pastimes; but toward his family he showed a loyal and enduring affection.

Foote's first appearance as an actor was made little more than two years after that of Garrick, as to whose merits the critics, including Foote himself, were now fiercely at war. His own first venture, as "Othello," was a failure; and though he was fairly successful in genteel comedy parts, and was after a favorable reception at Dublin, enrolled as one of the regular company at Drury Lane in the winter of 1745-6, he had not as yet made any palpable hit. Finding that his talent lay neither in tragedy nor in genteel comedy, he had begun to wonder (as he tersely expressed it) "where the devil it *did* lie," when his successful performance of the part of "Bayes," in *The Rehearsal*, at last suggested to him the true outlet for his peculiar talent. Following the example of Garrick, he had introduced into this famous part imitations of actors, and had added a variety of other satirical comment in the way of what in stage parlance is called "gag." He lost no time in availing himself of the discovery that in his powers of mimicry lay his surest means of securing a hold over the public. After engaging a small company of actors, he boldly announced for April 22, 1747, at the theater in the Haymarket ("gratis"), "a new entertainment called the *Diversions of the Morning*," to which were to be added a farce adapted from Congreve, and an epilogue "spoken by the B—d—d Coffee-house." Though, of course, nine-tenths of the fun in all such entertainments would evaporate even in a short-hand report, and though of these *Diversions* it is only possible to form a notion from scattered recollections and from such parts as were afterward incorporated in one of Foote's comedies (*Taste*, act i.), or adapted for later reproduction at Drury Lane (act ii. printed in Cooke's *Memoirs*), yet there is no difficulty in understanding the secret of Foote's immediate success, which is said at once to have obtained for him the name of "the English Aristophanes." The absurdity of this compliment has often been remarked upon; but it may be worth observing that Foote was probably himself the first (in his letter on *The Minor*) to decline the comparison, while "leaving the task of pointing out the mistake to his enemies." The *Diversions* consisted of a series of imitations of actors and other well-known persons, whose various peculiarities of voice, gesture, manner or dress were brought directly before the spectators; while the epilogue introduced the wits of the Bedford engaged in ludicrous disputation, and specially "took off" an eminent physician and a notorious quack oculist of the day. The actors ridiculed in this entertainment having at once procured the aid of the constables for preventing

its repetition, Foote immediately advertised an invitation to his friends to drink a dish of tea with him at the Haymarket, on the following day at noon—"and 'tis hoped there will be a great deal of comedy and some joyous spirits; he will endeavor to make the morning as diverting as possible. Tickets for this entertainment to be had at St. George's Coffee-house, Temple Bar, without which no person will be admitted. N. B.—*Sir Dildbury Diddle will be there, and Lady Betty Frisk has absolutely promised.*" The device succeeded to perfection; further resistance was abandoned as futile by the actors, whom Foote mercilessly ridiculed in the "instructions to his pupils," which the entertainer pretended to impart (typifying them under characters embodying their several chief peculiarities or defects—the massive and sonorous Quin as a watchman, the shrill-voiced Ryan as a razor-grinder, the charming Woffington, whose tones had an occasional squeak in them, as an orange-woman crying her wares and the bill of the play); and Mr. Foote's *Chocolate*, which was afterward converted into an evening *Tea*, became an established favorite with the town.

During his engagements at Covent Garden and at Drury Lane (of which he was, in passing, joint-manager), and in professional trips to Scotland, and more especially to Ireland, he appeared both in comedies of other authors and more especially his own. The entertainments in question may be briefly described as a succession of variations on the original idea of the *Diversions* and the *Tea*. Now, it was an *Auction of Pictures* (1748), of part of which an idea may be formed from the second act of the comedy *Taste*; now, a lecture on *Orators* (1754), suggested by some bombastic discourses given by Macklin in his old age at the Piazza Coffee-house in Covent Garden, where Foote had amused the audience and confounded the speaker by interposing his humorous comments. *The Orators* is preserved in the shape of a hybrid piece, which begins with a mock lecture on the art of oratory and its representatives in England, and ends with a very diverting scene of a pot-house forum debate, to which Holberg's *Politician-Tinman* can hardly have been a stranger. At a later date (1773) a new device was introduced in a *Puppet-show*; and it is a pity that the piece played in this by the puppets should not have been committed to print. It was called *Piety in Pattens*, and professed to show "by the moral how maidens of low degree might become rich from the mere effects of morality and virtue, and by the literature how thoughts the most commonplace might be concealed under cover of words the most high flown." In other words, it was an attack upon sentimental comedy, to which more than one blow had been already dealt, but which was still not altogether extinguished. Indeed, though no one now reads *Pamela*, it may be doubted whether she and her cousinhood will ever be altogether suppressed on the modern stage. The *Puppet-show* was also to have contained a witty attack upon Garrick in connection with the notorious Shakespeare jubilee; but this was withdrawn, and thus was avoided a recurrence of the quarrel which many years before had led to an interchange of epistolary thrusts, when the manager of Drury Lane had permitted Woodward to attempt an imitation of Foote. Of Johnson's opinions of him many well-known records remain in Boswell; and if it is remembered that when Johnson had at last found his way into Foote's company (he afterward found it to Foote's own table) he was unable to "resist" him, it should likewise not be forgotten that on hearing of Foote's death he recognized his career as worthy of a lasting biographical record.

Meanwhile most of poor Foote's friendships in high life were probably those that are sworn across the table,



and require "t'other bottle" to keep them up. It is not a pleasant picture — of Lord Mexborough and his royal guest the duke of York, and their companions, bantering Foote on his ignorance of horsemanship, and, after he had weakly protested his skill, taking him out to hounds on a dangerous animal. He was thrown, and broke his leg, which had to be amputated, the "patientee" (in which character, he said, he was now making his first appearance) consoling himself with the reflection that he would now be able to take off "old Faulkner" (a pompous Dublin alderman with a wooden leg, whom he had brought on the stage as Peter Paragraph, in *The Orators*) "to the life." The duke of York made him the best reparation in his power by promising him a life-patent for the theater in the Haymarket (1766); and Foote not only resumed his profession, as if, like Sir Luke Limp, he considered the leg he had lost "a redundancy, a mere nothing at all," but ingeniously turned his misfortune to account in two of his later pieces, *The Lane Lover* and *The Devil on Two Sticks*, while, with the true instinct of a public favorite, making constant reference to it in plays and prologues. He seemed to have lost none of his energy with his leg, though it may be observed that the characters played by him in several of his later plays are comparatively short and light. He continued to retain his hold over the public, and, about the year 1774, was beginning to think of withdrawing, at least for a time, to the Continent, when he became involved in what proved a fatal personal quarrel. Neither in his entertainments nor in his comedies had he hitherto (except in Garrick's case, and it is said in Johnson's) put the slightest restraint upon the personal satire by which he terrified his victims and delighted their neighbors. One of his earlier experiments of this kind (*The Author*), in which, under the infinitely humorous character of Cadwallader, he had brought a Welsh gentleman of the name of Ap-Rice on the stage, had, indeed, ultimately led to the suppression of the play. But, to an extent of which it is impossible fully to judge, he had pursued his hazardous course, mercilessly exposing to public ridicule and contempt not only fribbles and pedants, quacks or supposed quacks in medicine (as in *The Devil on Two Sticks*), impostors or supposed impostors in religion, such as Doctor Dodd (in *The Cozeners*) and Whitfield and his connection (in *The Minor*). He had not only dared the wrath of the whole Society of Antiquaries (in *The Nabob*), and been rewarded by the withdrawal, from among the pundits who rationalized away Whittington's Cat, of Horace Walpole and other eminent members of the body, but had in the same play attacked a well-known representative of a very influential though detested element in English society — the "Nabobs" themselves. But there was one species of cracked porcelain or blemished reputation which he was not to try to hold up to contempt with impunity. The rumor of his intention to bring upon the stage, in the character of Lady Kitty Crocodile in *The Trip to Calais*, the notorious duchess of Kingston, whose trial for bigamy was then (1775) impending, roused his intended victim to the utmost fury; and the means and influence she had at her disposal enabled her, not only to prevail upon the lord chamberlain to prohibit the performance of the piece (in which, it should be observed, there is no hint as to the charge of bigamy itself), but to hire agents to villify Foote's character in every way that hatred and malice could suggest. After he had withdrawn the piece, and letters had been exchanged between the duchess and him equally characteristic of their respective writers, Foote took his revenge upon the chief of the duchess' instruments, a "Reverend Doctor" Jackson, who belonged to the "reptile" society of the journalists of the day, so admira-

bly satirized by Foote in his comedy of *The Bankrupt*. This man he gibbeted in the character of Viper in *The Capuchin*, under which name the altered *Trip to Calais* was performed in 1776. But the resources of his enemies were not yet at an end; and a discharged servant of Foote's was suborned by Jackson to bring a charge and apply for a warrant against him. Though the attempt utterly broke down, and Foote's character was thus completely cleared, his health and spirits had given way in the struggle — as to which, though he seems to have had the firm support of the better part of the public, including such men as Burke and Reynolds, the very audiences of his own theater had been, or had seemed to be, divided in opinion. He thus resolved to withdraw, at least for a time, from the effects of the storm, let his theater to Colman, and after making his last appearance there in May, 1777, set forth in October on a journey to France. But at Dover he fell sick on the day after his arrival there, and after a few hours died (October 21st). His epitaph in St. Mary's Church at Dover (written by his faithful treasurer, Jewel,) records that he had a hand "open as day for melting charity." His resting place in Westminster Abbey is without any memorial; nor indeed is it the actor's usual lot to receive from posterity any recognition which the contemporaries whom he has delighted have denied to him.

FOPPA, VINCENZO, a painter, was born in Brescia soon after 1400, and died there in 1492. He settled in Milan toward 1425, and was the head of a school of painting which subsisted up to the advent of Leonardo da Vinci. His contemporary reputation was very considerable, his merit in perspective and foreshortening being recognized especially. Among his noted works are a fresco in the Brera Gallery, Milan, the *Martyrdom of St. Sebastian*; a *Crucifix* in the Carrara Gallery, Bergamo, executed in 1455; the *Trinity*, in the church of S. Pietro in Oliveto, Brescia, and other paintings in the same city.

FORAMINIFERA. This designation is part of that given by D'Orbigny in 1825, to an order of animals forming minute calcareous shells (found *recent* in shore-sand, and *fossil* in various tertiary limestones), for the most part many-chambered, and often bearing a strong resemblance in form to those of *Nautilus*, *Orthoceras*, and other chambered Cephalopods — his (supposed) *Cephalopoda foraminifera* being distinguished from the (real) *Cephalopoda sipunculifera* (*Nautilus* and its allies) by the want of the "siphon" which passes from chamber to chamber in the latter, and its replacement in the former by mere "foramina" in the dividing septa.

Most of the Families of this group have a very wide geographical distribution — this being especially the case with the smaller and simpler representatives of them that range over those vast areas in the deep oceanic basins, of which the bottom-temperature is kept down by the polar underflow. A striking resemblance has long been noted between the poor and feeble Foraminiferal fauna of shallow waters in colder-temperate seas, and that of great depths in tropical seas; and this similarity is now explained by the correspondence of the temperature to which these two faunæ are subjected. The larger and most developed examples of existing *Foraminifera*, on the other hand, are limited to the shallower seas near tropical shores, or covering coral reefs where the bottom-temperature is comparatively high; or to partially inclosed seas, like the Mediterranean and Red Sea, which are cut off from the polar underflow by the shallowness of the straits which connect them with the oceanic basin. It is in such seas that we meet with the largest *Orbiculina*, and the most complex *Orbitolites*



and *Alveolina*—the first of these “imperforate” types being generally abundant in tropical shore-sands, the second in shallow dredgings along the Australian coast, the great barrier-reef, and the lagoons of “atolls” in the Coral Sea, while the third seems to attain its highest development in the Philippine Seas. So, again, among the “perforate” *Lagenida*, we find the “nodosarian” and “cristellarian” types attaining a very high development in the Mediterranean; the most complex forms of the “rotalian” type, including the zoöphytic *Polytrema*, are only met with in tropical or sub-tropical seas; while, with the exception of small and modified *Polystomella* and dwarfed *Operculina*, there are no known representatives in the colder-temperate or polar seas either of the gigantic *Cycloclypeus*, or of the large *Opecculina* and *Heterostegina* of the tropics. But while the Foraminiferal fauna thus obviously depends on an elevated temperature for the attainment of its highest development as regards the size and complexity of its individual members, the numerical multiplication of its lower forms (as is the case in many other groups) seems to be favored by a much lower degree of warmth; so that we find the vast area of “globigerina-ooze” extending to the borders of the Polar seas. There, however, it ceases almost abruptly, the place of this calcareous deposit being taken by an accumulation of the siliceous skeletons of Radiolarians and Diatomaceæ.

It is not a little curious, however, that recent researches should have disclosed the fact, that the existing Arenaceous *Lituolida* attain their highest development—in regard no less to size and complexity of structure than to number—on the deep sea-bottom—the additions to our previous knowledge of the Foraminiferal fauna made by the dredgings of the *Porcupine*, the *Valorous*, and the *Challenger* having been far greater in this section than in either of the calcareous-shelled groups. And it would hence appear that an elevated temperature is not as essential to the high development of the *Foraminifera* which construct “tests” by gluing together grains of sand, as it is to that of the shell-forming types which separate the material of their “porcellaneous” or “vitreous” skeletons from the sea-water in which they live.

There is no division of the Animal Kingdom whose range in time (so far as is at present known) can be compared with that of the *Foraminifera*. Looking, indeed, to the vast series of ages that must have been required for the deposit of that long succession of Upper Laurentian and Huronian rocks which intervenes between the Eozoic Limestone of the Lower Laurentians of Canada, and the lowest strata in which the most ancient representatives of the Palæozoic fauna have as yet been found, it may even be said that all other fossils are modern by comparison. For the interval between the formation of the Canadian *Eozoön* and the period represented by the oldest fossils of the Lower Cambrian series seems undoubtedly to have been quite as great—geologically speaking—as that which intervened between the latter and the existing epoch, if not greater—the “fundamental gneiss” of Sir Roderick Murchison, which represents in central Europe the Laurentians of Canada, and near the base of which is found the kindred *Eozoön bavarium*, having a thickness estimated at 90,000 feet, and being overlaid by a great thickness of other non-fossiliferous rocks. Hence the determination of the organic origin of this Ophicalcite, and of its Foraminiferal affinities, which has been effected by the examination and comparison of parts of specimens so minute as to be scarcely visible to the naked eye, must be considered as one of the most remarkable results of microscopic research—fully equal in importance when considered in all its bearings, to

the discovery by Professor Ehrenberg of the Foraminiferal origin of chalk.

Indications of Eozoic structure have been found in various strata of uncertain age underlying the Silurian of North America, and also in some of the older rocks of the Scandinavian series; and there is no improbability in the idea that its existence may have been prolonged through the whole of that long period, commonly regarded as azoic, which has been designated by Professor Dana as *Archæan*. In the earliest strata usually accounted fossiliferous there are found, alike in the old and new continents, a number of curious organisms, sometimes of considerable size, which have received the names *Archæocyathus*, *Stromatopora*, and *Receptaculites*. The nature of these is still problematical, their internal structure not having yet been fully elucidated; but while it seems probable, on the other hand, that among the organisms whose similarity of external conformation has led to their association under these names, there may be several types of structure essentially different, there seems considerable reason to believe that some among them are really gigantic *Foraminifera*, presenting approximations to calcareous Sponges. The Limestones of the Silurian period have not been as yet minutely searched for the smaller forms of *Foraminifera*; but green sands of Silurian age occur in various localities, the grains of which can be identified as “internal casts” of Foraminiferal shells.

It is in the Carboniferous Limestone that we first recognize a varied and abundant Foraminiferal fauna, which has recently been made the subject of special study by Mr. H. B. Brady, whose very interesting results may be summed up as follows. (1) Of the “imperforate” or “porcellaneous” *Foraminifera* no examples have been detected. (2) Of the “perforate” or “vitreous” series, on the other hand, each principal group is represented: the *Lagenida* very slightly; the *Globigerinida* by *Textularia* and various *Rotalian* types; while of the *Nummulinida* we find, not only three generic forms that are at the same time individually small and scantily diffused, but (in certain localities) such an accumulation of comparatively large shells of *Fusulina*, that they constitute almost the sole material of calcareous beds extending over large areas. (3) A large proportion of the foraminiferal types of this period belong to that “arenaceous” group which at present contains not merely the *Lituolida*, whose “tests” are entirely made up of cemented sand-grains (among which the *Saccamina* is distinctly recognizable), but also a number of generic types more or less allied to the recent *Valvulina*, in which there is a “vitreous,” shelly basis, more or less thickly incrustated by an arenaceous envelope. The “isomorphism” of these with true “nodosarines” and “rotalines” suggests the question whether they are not really in an evolutionary stage between the true sandy-tested and the completely calcareous-shelled types.

But there is a larger question even than this—namely, whether those massive beds of Carboniferous Limestone whose texture is sub-crystalline, and in which scarcely any traces of organic structure are now discernible, do not owe their origin, like analogous beds of the Cretaceous formation, to Foraminiferal life. The general tendency of recent geological opinion has been to account for the absence of all traces of organic structure in such beds by the “metamorphism” they have undergone subsequently to their original deposition. Of the completeness with which such metamorphism may obliterate the evidence of organic origin in calcareous rocks it is impossible to have more “pregnant instances” than those afforded by the purely crystalline marble of Carrara, which is unquestionably a metamorphic Oolite,



and the crystalline conversion of the Antrim Chalk in the neighborhood of the basaltic outburst which forms the Giant's Causeway. The abundance of Corals, however, in various beds of Carboniferous Limestone, accompanied by such accumulations of Brachiopods, Crinoids, etc., as might have been associated with them on coral reefs, taken in connection with the fact that the substance of existing reef-building corals, when raised by upheaval, sometimes exhibits a metamorphism that causes it to bear a close resemblance to carboniferous limestone, has seemed to favor the belief that the azoic sub-crystalline beds of that formation had their origin in Coral growths. Against this, however, it may be urged that we have at the present time no *continuity* of Coral-growth over areas that are at all comparable to those which we find continuously covered with Carboniferous Limestone; that the real parallel to these is presented by the continuous beds of Chalk formerly deposited over vast marine areas, by those of the Nummulitic Limestone of the succeeding period, and by those of Globigerina-ooze still in progress of production; and that, if the tropical sea-bottom were now elevated into dry land, we should find over the deeper areas a continuous Foraminiferal deposit, interrupted in particular localities by upheaved reefs of Coral, whose slopes would be covered with calcareous-shelled Mollusks, Echinoderms, etc., bearing a general correspondence with the great Carboniferous Limestone formation.

Moreover, it has now come to be generally admitted that "metamorphism" is connected with mechanical disturbance, and especially with that "lateral thrust" which is the principal source of the plication and contortion of strata, and which must have given rise to the evolution of great heat. That such a change was extensively produced in the Carboniferous rocks of Great Britain at the end of the Palæozoic period, when the horizontal and continuous Coal-measures were thus broken up into separate "basins," bordered by intervening ridges formed by the uplifting of their subjacent limestone, is universally recognized. But, on the other hand, over the vast area of Russia that lies between the Baltic and the Ural mountains, there seems to have been no such force in action. Its strata are so nearly level that the determination of their order of superposition has been difficult. And there is such a remarkable absence of metamorphism even in those of Silurian age that we there find what are elsewhere *slates* represented by beds of *clay*, constituting the original form of that deposit, which has elsewhere acquired the slaty character by subsequent metamorphism. Now, since it is here that we also find the most extensive development of *Fusulina*-limestone in the place of those sub-crystalline beds which elsewhere form the great bulk of the Carboniferous Limestone, there seems exactly the same reason for regarding such a Foraminiferal deposit as the original form of those beds. And this view derives remarkable confirmation from the phenomena presented by the Carboniferous Limestone of Ireland, which has been recently studied with great care by Professor Hull. This formation extends over a very considerable area of the island — constituting in its central portion an elevated plateau, whose nearly horizontal strata present no indication of lateral thrust, while along the margin of this area the calcareous strata have been elevated into ridges by thrust from the outside, with more or less of plication and contortion. Now, in these marginal ridges the traces of organic origin are scanty — the presence of fossils, whether large or minute, being the exception and not the rule. In the level strata of the central plateau, on the other hand, the evidence of organic origin is almost everywhere complete; and while fossil Corals, Mollusks, Crinoids, etc., are abundant in particular beds, great

masses of the limestone are found by microscopic examination to consist of little else than minute Foraminiferal shells. A very strong case, then, seems made out for the belief that Foraminiferal life has contributed very largely to the production of those vast beds of Carboniferous Limestone (often exceeding 1,500 feet in thickness) in which scarcely any trace of organic origin can now be found — this share bearing to that of the Corals, which are generally credited with the whole, somewhat of the same proportion that the Foraminiferal ooze of the deep-sea-bottom at the present time does to the Coral reefs of shallow waters, and the shells of Mollusks and Echinoderms that live among them.

In the earlier Secondary rocks we do not find by any means the same evidence of abundant Foraminiferal life; but this is very probably to be accounted for by the conditions of their deposition. For during the Triassic period we find no representative of a deep oceanic calcareous deposit — the only considerable limestone bed (the *muschelkalk*) being obviously composed of the remains of the more developed fauna of comparatively shallow water. It is interesting, however, to find certain clay beds of the New Red Sandstone yielding *Foraminifera*, chiefly of the Cristellarian type, which can be identified — not only generically and specifically, but even varietally — with forms common in the Italian Tertiaries, and still living in the Mediterranean. In many of the Liassic clays *Foraminifera* are found in great abundance; and here the "porcellaneous" group first characteristically shows itself under one of its least modified types, the *Spiroloculina*. In the formation of many Oölitic Limestones it seems probable that *Foraminifera* had a considerable share. For while the material of many of the calcareous beds belonging to this formation was obviously furnished by debris of Corals, Echinoderms, and Mollusks, the nuclei of the component grains of the true Oölitic beds are so often found to be minute *Foraminifera*, that we seem justified in regarding those beds as having been formed by a sub-aërial metamorphosis of shore sands largely composed of the minute shells belonging to that group, like many tropical shore sands of the present time.

The highest development of the Foraminiferal type, as measured by the extraordinary abundance of its largest and most complex examples, seems to have been attained in the early Tertiary period, to which belongs the vast formation of Nummulitic Limestone, forming a band often of 1,800 miles in breadth, and sometimes attaining several thousand feet in thickness, which may be traced eastward from the Atlantic shores of Southern Europe and Northern Africa (the Pyramids being built of this rock, and on a terrace formed by it) through Western Asia to Northern India and China, and likewise over large areas in North America — thus taking, to use the words of Sir Charles Lyell, a far more conspicuous part than any other Tertiary group in the solid framework of the earth's crust. In some localities it seems to lie conformably upon Cretaceous strata, so as to establish the continuity between the latest Secondary deposits and the earliest Tertiaries formed in the deep sea. In some localities this Limestone is essentially composed of an aggregation of *Nummulites* (including, however, the fossil remains of higher organisms), the spaces between the large and entire shells being filled in by minuter forms and by the debris of previous generations of the larger; while in the other localities the *Nummulites* are replaced, wholly or in part, by *Orbitoides* and *Orbitolites*. In the Paris basin the Nummulitic Limestone is represented by the *Calcaire grossier*, which is for the most part of Foraminiferal origin. Its lower calcareous beds are chiefly Nummulitic; but in the middle part of the series we find the *Milioline* group



predominating, some of its beds being chiefly composed of *Orbitolites*, while others (notably those of which a large part of Paris is built) are essentially made up by the aggregation of the smaller *Miliolæ*. The calcareous sand of Grignon, which consists in great part (like many beds of the Oolitic formation) of shells comminuted by the action of the waves, contains a great abundance of *Foraminifera*,—among them the large and complex *Dactylopora*, which is only represented at the present time by a minute form of extreme simplicity. In various marine deposits of the middle and later Tertiary periods, especially those which form the slopes of the Apennines, *Foraminifera* are abundant; but the larger forms gradually give place to the smaller, and the Foraminiferal fauna progressively approximates more closely to that of the present time.

Altogether it would certainly be not too much to affirm that, so far as we are justified by positive evidence, no single group of the Animal Kingdom has contributed, or is at present contributing, so largely as the one of which a sketch has now been given to the formation of the crust of the earth,—by separating carbonate of lime from its solution in sea water, and thus restoring to the solid form the vast quantity of that material which is continually being taken up in solution, and discharged into the oceanic basin, by the percolation of rain-water through the calcareous strata which have been elevated into dry land, which are thus undergoing continual degradation. And if the origin of the great part of the Carboniferous Limestone in Foraminiferal rather than in Coral life be accepted as probable, the share taken by Foraminiferal life in this process during the Palæozoic period would appear to have been fully equalled by that which it took in the formation of the Chalk, and in the production of the Nummulitic Limestone, of more modern geological epochs.

FORBACH, a town of Lorraine, Germany, the chief town of a circle, is situated on an affluent of the Rossel and on the Metz and Saarbrücken Railway, about five and one-half miles southwest of Saarbrücken.

FORBES, ALEXANDER PENROSE (1817–1875), bishop of Brechin, was born at Edinburgh, June 6, 1817. In 1836 he went to Madras, but in consequence of ill-health, the result of the climate, he was obliged after two or three years to return to England. He then entered Brasenose College, Oxford, where in 1841 he obtained the Boden Sanskrit scholarship, and in 1844, took his degree of B.A. He was at Oxford during the early years of the great religious movement known for some time as Puseyism, and he was powerfully influenced by association with its leaders, Newman, Pusey and Keble, and entered heartily into their views and aims. In 1847 Forbes was called to succeed Bishop Moir in the see of Brechin. He removed the episcopal residence to Dundee, where he resided till his death, combining the pastoral charge of the congregation with the duties of the see. He died at Dundee, October 8, 1875.

FORBES, DAVID (1828–1876), F.R.S., an accomplished traveler, mineralogist, metallurgist, chemist, and writer on chemical geology, brother of Prof. Edward Forbes, was born at Douglas, Isle of Man, and received his early education there and at Brentwood in Essex. When a boy he manifested “an enthusiastic disposition as regards science,” and at the age of fourteen had already acquired a remarkable knowledge of chemistry. This subject he studied at the university of Edinburgh, and he was still young when he was appointed superintendent of the mining and metallurgical works at Espedal in Norway. Subsequently he became a partner in

the firm of Evans & Aiken, nickel-smelters, of Birmingham, and in that capacity visited Chili, Bolivar, and Peru. He died in London, December 5, 1876. Micro-petrology and chemical geology owe much to the researches of David Forbes.

FORBES, DUNCAN, of Culloden, was born at Bunchrew or at Culloden near Inverness on November 10, 1685. After he had completed his studies at the universities of Edinburgh and Leyden, he was admitted advocate at the Scottish bar in 1709. His own talents and the influence of the Argyll family secured his rapid advancement, which was still further helped by his loyalty to the Hanoverian cause at the period of the rebellion in 1715. In 1722 Forbes was returned member for Inverness, and in 1725 he succeeded Dundas of Arniston as lord advocate. He inherited the patrimonial estates on the death of his brother in 1734, and in 1737 he attained to the highest legal honors in Scotland, being made lord president of the Court of Session. As lord advocate, he had labored to improve the legislation and revenue of the country, to extend trade and encourage manufactures, and no less to render the Government popular and respected in Scotland. In the proceedings which followed the memorable Porteous mob, for example, when the Government brought in a bill for disgracing the lord provost of Edinburgh, for fining the corporation, and for abolishing the town-guard and city-gate, Forbes both spoke and voted against the measure as an unwarranted outrage on the national feeling. As lord president, also, he carried out some useful legal reforms; and his term of office was characterized by quick and impartial administration of the law. The rebellion of 1745 found him at his post, and it tried all his patriotism. For some years before, he had repeatedly and earnestly urged upon the Government the expediency of embodying Highland regiments, putting them under the command of colonels whose loyalty could be relied upon, but officering them with the native chieftains and cadets of old families in the north. “If the Government,” said he, “preëngages the Highlanders in the manner I propose, they will not only serve well against the enemy abroad, but will be hostages for the good behavior of their relations at home; and I am persuaded that it will be absolutely impossible to raise a rebellion in the Highlands.” Such a plan was afterward successfully pursued by Chatham; but, though Walpole is said to have approved of the scheme, it was not adopted by the council. On the first rumor of the Jacobite rising, Forbes hastened to Inverness, and through his personal influence with the chiefs of Macdonald and Macleod, those two powerful western clans were prevented from taking the field for Charles Edward; the town itself also he kept loyal and well protected at the commencement of the struggle, and many of the neighboring proprietors were won over by his persuasions. But at this critical juncture of affairs, the apathy of the Government interfered considerably with the success of his negotiations. Advances of arms and money arrived too late, and though Forbes employed all his own means and what money he could borrow on his personal security, his resources were quite inadequate to the emergency. It is doubtful whether these advances were ever fully repaid. Part was doled out to him, after repeated solicitations that his credit might be maintained in the country; but it is evident he had fallen into disgrace in consequence of his humane exertions to mitigate the impolitic severities inflicted upon his countrymen after their disastrous defeat at Culloden. The ingratitude of the Government, and the many distressing circumstances connected with the insurrection, sunk deep into the mind of Forbes. He never fairly rallied from the depression thus caused, and after a period of declining



health he died on December 10, 1747, in the sixty-second year of his age.

FORBES, EDWARD (1815-54), F.R.S., a celebrated naturalist, was born at Douglas, in the Isle of Man, February 12, 1815. In June, 1831, he left the Isle of Man for London, where during four months he studied drawing under Mr. Sass, a well-known artist. In October, however, having given up all idea of making painting his profession, he returned home; and in the following month he matriculated as a student of medicine in the university of Edinburgh. During his first winter session there he attended lectures on anatomy, theoretical chemistry, and materia medica; and in the ensuing summer session botany, natural history, and practical chemistry claimed his attention. His vacation in 1832 he spent in diligent work on the natural history of the Isle of Man. In 1833 he made a tour in Norway, the botanical results of which were published in London's *Magazine of Natural History* for 1835-36. In the summer of 1834 he visited the Isle of Man and Wales, and devoted much time in dredging the Irish Sea; and in the succeeding year he traveled in France, Switzerland and Germany. Born a naturalist, and having no relish for the practical duties of the surgeon or physician, Forbes was no zealous student of medicine, and he finally in the spring of 1837 abandoned the idea of taking a medical degree, resolving to devote himself to science and literature. The winter of 1836-37 found him at Paris, where he attended the lectures at the Jardin des Plantes on natural history, comparative anatomy, geology, and mineralogy. Leaving Paris in April, 1837, he repaired to the south of France, whence he went to Algiers, and during a month there spent he obtained minerals for a paper on land and freshwater Mollusca, published in the *Annals of Natural History*, vol. ii. p. 250. In the autumn of the same year he registered at Edinburgh as a student of literature; and in 1838 appeared his first volume, *Malacologia Monensis*, a synopsis of the species of Manx Mollusca. During the summer of 1838 he visited Styria and Carniola, and made extensive botanical collections. In the following autumn he read before the British Association at Newcastle a paper on the distribution of terrestrial Pulmonifera in Europe, and was commissioned to prepare a similar report with reference to the British Isles. On returning to Edinburgh he delivered a course of fifteen lectures on the natural history of the animals in the British seas. In 1841 was completed the publication of Forbes' great work, *A History of British Star-fishes*, embodying the results of researches carried on for a long series of years, and containing 120 illustrations, inclusive of humorous tail-pieces, all designed by the author. On April 17th of the same year Forbes, accompanied by his friend William Thompson, joined at Malta, H.M. surveying ship *Beacon*, to which he had been appointed naturalist by her commander, Captain Graves. From that date until October, 1842, he was busily employed in investigating the botany, zoölogy, and geology of the Mediterranean region. The results of his researches were made known in his "Report on the Mollusca and Radiata of the Ægean Sea, presented to the British Association in 1843," and in *Travels in Lycia*, published in conjunction with Lieutenant Spratt, in 1846. In the former treatise he discussed the influence of climate and of the nature and depth of the sea bottom upon marine life, and divided the Ægean into eight biological zones; his conclusions with respect to bathymetrical distribution, however, have been shown by later investigators to require certain considerable modifications. Toward the end of the year 1842, Forbes, whom family misfortunes had now thrown upon his own resources

for a means of livelihood, sought and obtained the curatorship of the collections of the Geological Society of London. To the duties of that post he, in May of the following year, added those of the professorship of botany at King's College, where he lectured with success to the second largest botanical class in London. On November 1, 1844, having resigned the curatorship of the Geological Society, he became palæontologist to the Geological Survey, with a yearly salary of £300. In 1846, Forbes published in the *Memoirs of the Geological Survey*, i. 336, his important treatise "On the Connection between the existing Fauna and Flora of the British Isles, and the Geographical Changes which have affected their Area." It is therein pointed out that, in accordance with the theory of their origin from various specific centers, the plants of Great Britain may be divided into five well-marked groups: the west and southwest Irish, represented in the north of Spain; the southeast Irish and southwest English, related to the flora of the Channel Isles and the neighboring part of France; the southeast English, characterized by species occurring on the opposite French coast; a group peculiar to mountain summits, Scandinavian in type; and, lastly, a general or Germanic flora. From a variety of arguments the conclusion is drawn that the greater part of the terrestrial animals and flowering plants of the British Islands migrated thitherward, over continuous land, at three distinct periods, before, during, and after the glacial epoch. In the autumn of 1848 Forbes married the daughter of General Sir C. Ashworth. Since his return from the East in 1842, the determination and arrangement of fossils, the investigation of strata, frequent lectures, and incessant and wearing literary work, including the preparation of his admirable palæontological memoirs, and of a variety of scientific articles and reviews, had precluded Forbes from giving that attention to the natural history pursuits of his earlier life which he had for years earnestly desired. It seemed that at length he was to find leisure to reduce to order and commit to the keeping of the press those vast stores of biological information of which long protracted and original research had made him the possessor. At Edinburgh, in the summer session of 1854, he lectured to a large and appreciative audience; and in September of that year he occupied the post of president of the geological section at the meeting of the British Association. He had already commenced his winter's course of lectures in Edinburgh, when he was seized with feverishness, culminating in an attack of nephritic disease, from which he had on several previous occasions been a sufferer. His symptoms soon became alarming, and after not many days' illness he expired at Wardie, near Edinburgh, November 18, 1854, in the fortieth year of his age.

FORBES, JAMES DAVID (1809-1868), successively professor of natural philosophy in the university of Edinburgh, and principal of the United College in the university of St. Andrews, was the fourth son of Sir William Forbes of Pitsligo, the lineal representative of the Forbeses of Monymusk and Pitsligo. At an early age he developed remarkable powers of self-education. Passionately fond of natural science, he stored his mind with all available knowledge of physics, constructed for himself astronomical instruments, and actually commenced a connected series of meteorological observations, which he kept up for many years. But these pursuits were carried on without the knowledge of his family; for Sir William had destined him for the bar, and Forbes loved his father too well to betray tastes and inclinations which might seem to point toward a different career. In November, 1825, he entered the university of Edinburgh, and joined the classes of Latin and



chemistry. He still continued his self-imposed studies, and at length forwarded anonymously to Sir David (then Dr.) Brewster, who was at the time conducting the *Edinburgh Philosophical Journal*, a paper on "The Apparent Number of the Stars." It was at once inserted, and further communications were requested from the anonymous "A." The request was complied with, and during an extended tour through France, Germany and Italy, in company with a large family party, Forbes contributed a number of papers on *The Physical Geography of the Bay of Naples*, *The Horary Oscillations of the Barometer at Rome*, and other subjects, all of which were inserted in the *Journal*. On his return to Scotland after a year's absence, he made himself known to Brewster as his unknown correspondent. Brewster, astonished at his extensive reading and remarkable powers of observation, encouraged him in his scientific pursuits, and proposed him as a fellow of the Royal Society of Edinburgh, to which, at the age of nineteen, he was elected. In the meantime he had reëntered college, where his subsequent career was a distinguished one. In the class of moral philosophy, taught by the celebrated Professor Wilson, he gained the highest honors, and in Sir John Leslie's natural philosophy class he twice carried off the gold medal. An event now occurred which changed the whole tenor of his life. His father died on October 24, 1828, and it became necessary that Forbes should seriously consider his future course of life. The choice lay between the bar and a scientific career, and after much consultation with his friends he chose the latter. He passed his law trials indeed, and put on his advocate's gown, but never wore it, for a competence given him by his father rendered him independent. About this time Sir David Brewster was engaged in laying the foundations of the British Association. Forbes joined cordially in the work, and contributed much toward placing the Association on the basis it now occupies. Throughout the rest of his life he attended, with rare exceptions, all its meetings, often breaking off a foreign tour, and hastening back to do so. The presidency of the meeting held at Dundee in 1867 was offered to him, but ill health compelled him to decline it.

Immediately after his election as fellow of the Royal Society of London, in June, 1832, Forbes started on an extensive scientific tour, but was suddenly recalled from Geneva by news of the death of Sir John Leslie, professor of natural philosophy at the university of Edinburgh. Forbes had left word, that should this chair at any time become vacant, he desired to be put in nomination, and on his return found that this had actually been done. He also found himself, to his surprise and dismay, the rival of his old friend Sir David Brewster. But Forbes was already committed, and had received testimonials from Whewell, Airy, Peacock, Vernon Harcourt, Chalmers, and others, bearing high testimony to his attainments, and the immense results they promised. After a more than usually excited contest, into which politics to some extent entered, Forbes was elected, at the age of twenty-four, to a professorial chair of the highest distinction. The inaugural lecture with which he opened the session of 1833-34 was listened to with unusual interest. As a professor, he more than realized the high expectations which had been formed of his special capacity for the work. During the twenty-seven years of his professorship his lectures left no branch of natural philosophy untouched, and owing to his thorough acquaintance with the literature of the subject, each of them was a mass of condensed information—not, however, confined to old knowledge taken from books, but enriched from time to time by the results of original research, enlivened by many

a happy illustration drawn from his travels and adventures, and rendered more effective by his clear ringing voice and graceful delivery. Again, in 1841, there was much discussion in the senatus as to the disposal of a large sum of money bequeathed by General Reid for the foundation of a chair of music and for other purposes. Forbes strongly opposed the idea of a musical professorship, urging that the money would be more usefully employed in providing retiring allowances for superannuated professors. But controversy ran high, litigation ensued, and after years of contention a part of the Reid bequest was assigned by the law courts to the chair of music. Next year another large sum, the Straton fund, had to be dealt with, and here again Forbes was instrumental in inducing the senate to devote what was left of the Reid bequest, combined with the Straton fund, to the foundation of fellowships to be held by distinguished students after graduation. In these and other controversies the uncompromising energy with which he strove to carry out his views of what was right could not fail to bring him into collision with men whose opinions were as decided, and their wills as strong as his own. When two such unbending natures as Sir William Hamilton and James Forbes came into contact—as they did more than once—the shock was a rough one; but although they differed widely in opinions, each has left a permanent mark for good on the university.

Forbes generally devoted part of each vacation to excursions with his family in various parts of Scotland, and to geological tours among his native mountains, in the course of which, at times in company with some scientific friend, more often alone, he traversed on foot the greater part of the Highlands. In 1856 he acquired a beautiful cottage near Pitlochrie in Perthshire, where the succeeding summers were chiefly spent. From 1835 to 1851 Forbes usually passed some months on the Continent, traveling, as he expressed it, not as an amusement, but as a serious occupation, with De Saussure before him as a model. And it may be almost doubted whether science did not profit as much by his summer travels as by his winter work.

His first tour was devoted to the geology of the Pyrenees and of the Vivarais—the latter of which he afterward revisited. In 1837, after a short sojourn at Bonn, for the purpose of study, he traveled throughout Germany and Austria, making frequent experiments on terrestrial magnetism and other subjects. In 1839, among the crags and glaciers of Monte Viso, of the Pelvoux range, and of the Alps of Cogne, he learned to be an active and intrepid mountaineer; and during the intervals of his glacier investigations he did good service in opening up Alpine districts before scarcely known to Englishmen, by a series of excursions extending over the whole of the Pennine chain.

But of all his journeys and discoveries, those made by him among the mountains of Savoy are most popularly known; and their results have associated his name forever with the glaciers of the Alps. In 1840, while presiding over the physical section of the British Association at Glasgow, he met M. Agassiz of Neuchâtel—who, after spending several years in the study of glacial phenomena, had just published his *Études sur les Glaciers*—and agreed to visit Switzerland with him the following year. Accordingly, at the close of the session of 1840-41, Forbes joined Agassiz and his party at the well-known "Hôtel des Neuchâtelois," a small hut on the moraine of the Lauter Aar Gletscher. After a fortnight spent in exploration and observation, in the course of which Forbes called attention for the first time to the veined structure of glacier ice, they ended the campaign by the passage of the Ober Aar Joch, and the



ascent of the Jungfrau. This was Forbes' apprenticeship in glacier observation—a field of inquiry then jointly occupied by two rival theories, the gravitation or sliding theory of De Saussure, and the dilatation theory of Charpentier. After a close analysis of these, Forbes not only showed conclusive physical reasons for rejecting both, but pointed out the impossibility of forming a sound theory of glaciers until the internal structure of these anomalous bodies had been investigated, and the character and velocity of their motions ascertained.

These important data Forbes resolved to obtain for himself, and the summer of 1841 found him at Chamounix, engaged in a close examination of the Mer de Glace. He attacked the problem for the first time as a question of pure physics, executed accurate measurements with instruments of precision, and at once established the fact that the motion of a glacier averages roughly a foot in twenty-four hours, and that such motion is continuous. As his observations went on, he successively discovered that the center of the glacier moves faster than the sides, and the surface than the ice vertically below it, that its velocity increases directly with the steepness of its bed, and that the motion of a portion of the glacier when embayed behind a rock is greatly diminished, and the whole mass distorted, without any solution of continuity taking place. Convinced by these discoveries that the resemblance between a glacier and a river, already noticed by Captain Hall, Msgr. Rendu, and others, was more than a mere analogy, he deduced from the above-mentioned data the following theory of glacier motion: *A glacier is an imperfect fluid or a viscous body, which is urged down slopes of a certain inclination by the mutual pressure of its parts.* In reply to the strongly urged objection that ice is by its nature a brittle solid, and not sensibly possessed of any viscous quality, he asserted that ice is only hard and crystalline at a temperature of 30° F. or lower, and that at 32° it is a plastic solid, possessing a slight but perfectly sensible genuine molecular plasticity. When the urgency of the forces to which it is subjected causes this limit to be overpowered, a general bruise takes place, producing innumerable internal fissures, with finite displacements in certain planes, and subsequent restoration of continuity by "time and cohesion;" hence the blue bands of the conchoidal veined structure. When the urgency is still greater the mass acts like a solid, and crevasses open. In the case of glacier ice an additional element of plasticity exists, for glacier ice is scarcely ever coherent. It is usually a congeries of irregular polyhedrons tightly wedged together, possessing a rude flexibility, and always traversed by an infinity of capillary fissures. Hence a glacier is really a compound of ice and water, more or less plastic according to its wetness and infiltration—a fact proved by its more rapid motion in summer when saturated with water, and its relative retardation in winter, when the surface water remains frozen. Forbes' "viscous theory" was sharply criticised, but it is now universally accepted, subject to some modifications which do not affect the groundwork of the structure, and rather elucidate than disprove his conclusions. But besides scientific criticism, he was compelled to defend himself—which he did with complete success—against insinuations, not only of plagiarism, but of an endeavor to suppress the rights of others to priority of discovery.

During the winter which followed this eventful summer, Forbes was busily engaged in writing his *Travels Through the Alps of Savoy*, a charming contribution to Alpine literature, in which graphic descriptions of scenery and mountaineering are happily blended with accounts of his scientific researches. Its last lines were written almost on the eve of his marriage with Alicia,

eldest daughter of the late George Wauchope, Esq. They started on their marriage tour to Switzerland, but had only got so far as Bonn, when Forbes was attacked by a dangerous illness, and it was not until August that they reached the Alps. He was then so far restored as to be able to resume his observations on the glaciers of Chamounix and Grindelwald, but as the winter approached he was pronounced unequal to the work of the following session at Edinburgh. His request for permission to appoint a substitute was readily granted, and he set out with Mrs. Forbes for Italy. Naples and Rome were their headquarters until the end of May, and the summer months were passed at the Italian lakes and in Switzerland. Forbes returned to Edinburgh in the autumn of 1844, and carried on his work during the winter months, but his health had suffered a rude shock, from the effects of which he never entirely recovered. The succeeding summer was spent with his family in the Highlands of Scotland; but the vacation of 1846 found him again on the Mer de Glace, engaged in observations on the ablation of the surface of the glaciers, and the difference of movement between the surface and the underlying ice. His next and last visit to the Alps in 1850 was entirely occupied in putting the finishing touches to his survey of the Mer de Glace, which was for some years after its publication the only correct Alpine map in existence. At the close of the session of 1850–51 he started for Norway with the double purpose of observing a total eclipse of the sun visible at Bergen, and of comparing the phenomena of the arctic glaciers with those of the Alps. These objects were not attained without great fatigue and exposure; Forbes returned from Norway with health much impaired, and had scarcely recommenced his work when he was attacked by hæmorrhage, the precursor of a long and dangerous illness. All through December he lay between life and death, but in January he was able to be removed to Clifton, which he made his headquarters for two years. During this enforced leisure he was constantly engaged in writing a very able *Dissertation on the Progress of Mathematical and Physical Science*, for the pages of the *Encyclopædia Britannica*, and in preparing for the press a work on *Norway and Its Glaciers*, similar in character to his *Glaciers of the Alps*, and scarcely yielding to it in picturesqueness of narrative or careful observation. In the summer of 1853 he was called from Clifton to Oxford to receive the honorary degree of D.C.L. During the three sessions of Forbes' absence, his class work had been conducted by Professor Kelland, but the session of 1854–1855 found him again at his post, and he worked with but little interruption from illness until 1859, assisted latterly by Dr. Balfour Stewart. In that year the current of his life was turned into another channel. Owing to the translation of Sir David Brewster to the principalship of the Edinburgh university, the principalship of the United College of St. Andrews became vacant; Forbes offered himself as candidate, and was successful. His commission bears date December 2, 1859, but he did not resign his professorship until the following April. The degree of LL.D. was then conferred on him by the university which his own labors had so greatly benefited and adorned.

In the spring of 1867 Forbes' health gradually declined, and toward the end of September he set out with his wife and three daughters to Cannes, and afterward went on to Hyères. His health now continued to improve until the middle of January, when he was again attacked by hæmorrhage brought on by fatigue. He never sat up again, and while in that painful state the presidency of the Royal Society of Edinburgh was offered to him and declined. It was evident that a



summer at Hyères was impossible, so he was conveyed, together with one of his daughters, who was almost in the same sad condition as himself, to Clifton, where he lingered for eight months, awaiting his end with patient calmness, sustained by the deep and fervent religious faith which had characterized his boyhood, and which a life of active scientific research had strengthened rather than impaired. He died on December 31, 1868.

FORBES, SIR JOHN, M.D., was born at Cuttlebrae, Banffshire, Scotland, in 1787. He attended the grammar school at Aberdeen, and afterward entered Marischal college. Having for nine years been assistant surgeon and surgeon in the navy, he in 1817 graduated at Edinburgh, and then commenced practice in Penzance, whence he removed to Chichester. He took up his residence in London in 1840, and was the same year appointed physician to the prince consort, and in 1841 physician to the queen's household. He was a fellow of the Royal Society, and D.C.L. of Oxford, and in 1853 he received the honor of knighthood. He died November 13, 1861, at Whitchurch, in Berkshire.

FORBIN, CLAUDE DE, French naval commander, was born in Provence, of a family of high standing, in 1656. High-spirited and ungovernable in his boyhood, he ran away from his home, and through the influence of an uncle entered the navy, serving his first campaign in 1675. For a short time he quitted the navy and entered the army, but soon returned to his first choice. He made under D'Estrées the American campaign, and under Duquesne that of Algiers in 1683, on all occasions distinguishing himself by his impetuous courage. The most remarkable episode of his life was his mission to Siam. During the administration of the Greek adventurer Faulcon in that country, the project was formed of introducing the Christian religion and European civilization, and the king sent an embassy to Louis XIV. In response a French embassy was sent out, Forbin accompanying the Chevalier de Chaumont with the rank of major.

He served under D'Estrées at the taking of Barcelona, was sent ambassador to Algiers, and in 1702 took a brilliant part in the Mediterranean in the war of the Spanish succession. In 1706 he took command of a squadron at Dunkirk, and captured many valuable prizes from the Dutch and the English. In 1708 he was intrusted with the command of the squadron which was to convey the Pretender to Scotland; but so effectually were the coasts guarded by Byng that the expedition failed and returned to Dunkirk. Forbin was now beginning to be weighed down with the infirmities of age and the toils of service, and in 1710 he retired to a country house near Marseilles. There he spent part of his time in writing his memoirs, published in 1730, which are full of interest and are written in a graphic and attractive style. Forbin died March 4, 1733.

FORCELLINI, EGIDIO (1688-1768), an Italian philologist, was born at Fener, in the district of Treviso, and belonged to a very poor family. He went to the seminary at Padua in 1704, studied under Facciolati, and in due course attained to the priesthood. From 1724 to 1731 he held the office of rector of the seminary at Ceneda, and, from 1731 to 1765, that of father confessor in the seminary of Padua. The remaining years of his life were mainly spent in his native village. He died at Padua in 1768 before the completion of the great work by which his name is preserved. This is a vast *Latin Lexicon*, usually referred to as Facciolati's, which has formed the basis of all similar works that have since been published.

FORCHHAMMER, JOHAN GEORG, a Danish mineralogist and geologist, was born at Husum on July 26, 1794, and died at Copenhagen on December 14,

1865. After studying at Kiel and Copenhagen from 1815 to 1818, he joined Oersted and Esmarch in their mineralogical exploration of Bornholm, and took a considerable share in the labors of the expedition. In 1820 he obtained his doctor's degree by a chemical treatise, *De Mangano*, and immediately after set out on a journey through England, Scotland, and the Faroë Islands. In 1823 he was named university lecturer on chemistry and mineralogy; in 1829 he obtained a similar post in the newly established polytechnic school; and, in 1831, he was appointed professor of mineralogy in the university, and as such became curator of the geological museum. On the death of Oersted in 1851, he succeeded him as director of the polytechnic school, and secretary of the academy of sciences.

FORCHHEIM, a fortified town of Bavaria, circle of Upper Franconia, is situated near the junction of the Wiesent with the Regnitz, sixteen miles south-southeast of Bamberg. Population (1890), 4,200.

FORD, JOHN, one of the most noteworthy writers of the old English drama in the period of the first decline, was born in 1586 at Ilslington in North Devon. He came of a good family; his father was in the commission of the peace, and his maternal grandfather, Sir John Popham, was successively attorney-general and lord chief justice. John Ford, like his cousin and namesake (to whom, with other members of the society of Gray's Inn, he dedicated his play of *The Lover's Melancholy*), entered the profession of the law, being admitted of the Middle Temple in 1602; but he seems never to have been called to the bar. Four years afterward he made his first appearance as an author with an elegiac effusion called *Fame's Memorial, or the Earl of Devonshire Deceased*, and dedicated to the widow of the earl, a lady who would have been no unfitting heroine for one of Ford's tragedies of lawless passion, the famous Penelope, formerly Lady Rich. It is more interesting to notice an epigram in honor of the author of *Love's Sacrifice* and *The Broken Heart* by a poet of a very different kind, but in whose genius it is not paradoxical to assert that there were points of contact with Ford's — Richard Crawshaw, morbidly passionate in one direction as Ford was in another. Toward the public, Ford seems, by reason either of his social position or of his personal character, to have assumed an attitude of independence; but, for an assailant of the theater, such as the author of *Histrionastix*, he displays, like his friend Shirley, a dramatist's inevitable scorn.

It has been concluded, from evidence of a rather vague description, that in the latter part of his life he gratified the tendency to seclusion for which he has been thought to be ridiculed in a contemporary poem, by withdrawing from business and from the literary life in London, to his native place; but nothing is known as to the date of his death. His career as a dramatist very probably began with some plays in which he assisted, or was assisted by, other authors.

When writing *The Lover's Melancholy*, it would seem that Ford had not yet become fully aware of the bent of his own dramatic genius, although he was already master of his powers of poet expression. We may suppose him, when he first became a dramatic author, to have been attracted toward both domestic tragedy and romantic comedy — to the former by an irresistible desire to sound the depths of abnormal conflicts between passion and circumstances, to the latter by a strong, though not widely varied imaginative faculty, and by a self-delusion (such as will alone account for his repeated — and nearly always unsuccessful — efforts in this direction) that he was possessed of abundant comic humor. In his next two works, undoubtedly those most character-



istically expressive of his peculiar strength, viz., *'Tis Pity She's a Whore* and *The Broken Heart* (both printed 1633), he had found themes the horrible situations in which require dramatic explanation by intensely powerful motives. Ford by no means stood alone among our dramatists in his love of abnormal subjects; but few were so capable of treating them sympathetically, and at the same time without that reckless grossness or extravagance of expression which renders the morally repulsive æsthetically intolerable, or converts the horrible into the grotesque. For in Ford's genius there was an element of true refinement, except when the self-delusion referred to came into play. In a third tragedy, *Love's Sacrifice* (also printed in 1633), he again worked on similar materials; but this time he unfortunately essayed to base the interest of his plot upon an unendurably unnatural possibility—doing homage to virtue after a fashion in which to honor is almost equivalent to insulting her. He might seem by this time to have been in danger of indulging still further a morbid tendency, the corroding influence of which is fatal to any genius abandoning itself to it; yet we find him in *Perkin Warbeck* (printed 1634) choosing an historical subject, and, alone among the dramatists of his age, seeking to emulate the glory of the great series of Shakespeare's national histories. It is true that his treatment of his theme, though neither unskillful nor unworthy, could not at once compass the breadth and variety which this species of drama demands. But the effort is one of the most commendable, as it was by no means one of the least successful, in the dramatic literature of this period; and we may unhesitatingly regret that he should not have made another essay in the same field, instead of turning to romantic comedy, for which he was without the requisite buoyancy of spirit, while all but devoid of the faintest vestige of comic humor. *The Fancies Chaste and Noble* (printed 1638), though it includes scenes of real force and feeling, is dramatically a failure, of which the main idea is almost provokingly slight and feeble; and *The Lady's Trial* (acted 1638, printed 1639) is only redeemed from utter wearisomeness by an unusually even pleasingness of form. There remain two other dramatic works, of very different kinds, in which Ford coöperated with other writers, the mask of *The Sun's Darling* (acted 1624, printed 1657), which is hardly to be placed in the first rank of early compositions, and *The Witch of Edmonton* (printed 1658, but probably acted about a quarter of a century earlier), in which we see Ford as a joint writer of one of the most powerful domestic dramas. He died in 1640.

FORD, RICHARD (1796–1858), author of one of the earliest and best of travelers' *Handbooks*, was the eldest son of Sir Richard Ford, who in 1789 was member of parliament for East Grinstead, and for many years afterward chief police magistrate of London. He was educated at Winchester, graduated at Trinity College, Oxford, and was called to the bar in Lincoln's Inn. Ford, however, never practiced the profession of a lawyer, and in 1830 he landed for the first time in Spain, where he traveled for three years, spending much of his time in the Alhambra, and at Seville. On his return to England in 1833 he settled in Devonshire at Heavitree, near Exeter, where, writes his friend, the late Sir William Stirling Maxwell, "he built himself a charming residence, and surrounded it with gardens and terraces, which he adorned with graceful Moorish buildings, and planted with pines and cypresses from historic groves by the Xenil and Guadalquivir." From 1837 to 1857 he contributed to the *Quarterly Review*, his first contribution to that periodical being a paper on the apparently uninviting subject of Devonshire cob walls, and his last a review of *Tom Brown's School Days*. His first work

was the pamphlet, *An Historical Inquiry into the Unchangeable Character of a War in Spain* (Murray, 1837), in reply to one called the *Policy of England Towards Spain*, and issued under the patronage of Lord Palmerston. He spent the winter of 1839–40 in Italy, where he added largely to his collection of majolica; and soon after his return he began, at Mr. Murray's invitation, to write his *Handbook for Travellers in Spain*, the literary work with which his name is chiefly associated. In consequence of the failure of his health, he was obliged to resign his seat on a royal commission that had been appointed, in the winter of 1856–7, to report on the best site for the National Gallery, and he died on August 31, 1858.

FORD, THOMAS, an English musician, of whose life little more is known than that he was attached to the court of Prince Henry, son of James I. His works also are few, but they are sufficient to show the high stage of efficiency and musical knowledge which the English school had attained at the beginning of the seventeenth century. They consist of canons and other concerted pieces of vocal music, mostly with lute accompaniment.

FORDUN, JOHN OF. Little is known with any certainty of this chronicler, and the so-called lives of him are mainly a collection of conjectures more or less probable. The credulity of our early writers is pardonable; the nonsense of some later ones is without excuse. A notice inserted in the *New Statistical Account* of the parish of Fordoun in Kincardineshire begins thus: "John of Fordun, the historian, was either a native of the parish or resident in it when he wrote his history of Scotland. He is called by Bede 'venerabilis vir Dominus Joannes Fordun, Presbyter.'"

FORESTS. A forest is a tract of country covered with trees, of one or several species, or with trees and underwood. Forests are of the greatest importance in the general economy of the globe, influencing the humidity of the air and soil, mitigating the extremes of heat and cold, affording shelter to man and beast, and enriching the soil on which they grow. Trees supply timber and fuel to man, and furnish him with a vast variety of economical products, such as gums, drugs, dyes, and articles of food. The management of large areas of natural or planted woodlands is called Forestry or Sylviculture. For the culture and uses of individual trees, see the separate articles, such as BIRCH, ELM, FIR, OAK, etc.; and for ornamental belts, avenues, etc., the reader is referred to ARBORICULTURE.

Historical records give us reason to believe that the habitable earth was generally covered with forest growth before it became the abode of man, and additional proof of this is found in the extensive remains of ancient trees. The geological record may also be referred to, as evidencing by its coal-fields the extensive breadths once covered by the richest vegetation.

The arboreal vegetation of the earth is remarkable for its great variety; many countries are rich in pines, others in oaks; Australia in Eucalyptus or gum trees, India in teak, California in Wellingtonia or Sequoia, and Brazil in palms. Trees, like other plants, require different degrees of heat, light, moisture, and elevation above the sea for their vigorous development, and hence various countries have their characteristic forests. The birches and pines of the North make way in the temperate zone for oaks and beeches, and in the tropics for palms and other heat-loving trees. The same trees seem to require similar climates, but the same climates do not always produce the same plants. The mountains of South India and Ceylon closely resemble the regions where the cinchona forests occur, but the genus is wanting in Asia. Again the teak is unknown in America, although parts of Brazil resemble its home



in Malabar. These anomalies are explained perhaps mainly by the primitive distribution of the plants (see DISTRIBUTION). It is also remarkable that some forests consist solely of one particular tree (on the Continent technically called "pure forest," in contradistinction to mixed forests), such as the birch in Lapland, the deodar in the Himalaya, the *Abies canadensis* and *Pinus strobus* in North America. The European forests, on the contrary, are generally composed of coniferous trees mingled with oak, elm, ash, beech, poplar, willow, alder, birch, and lime, interspersed with hornbeam, and various species of *Pyrus* and *Prunus*, the underwood being hazel, elder, buckthorn, viburnum, roses, etc. The American forests contain a still greater variety of species, a fact strikingly illustrated by Sir J. D. Hooker, in speaking of a patch of native forest a few miles from St. Louis on the Missouri: "In little more than half an hour, and less than a mile's walk, I saw forty kinds of timber trees, including eleven of oak, two of maple, two of elm, three of ash, two of walnut, six of hickory, three of willow, and one each of plane, lime, hornbeam, hop-hornbeam, laurus, diospyros, poplar, birch, mulberry, and horse-chestnut, together with about half that number of shrubs."

The physical history of every country proves incontrovertibly that a moderate extent of forest promotes in a high degree both its agricultural and its manufacturing interests, as well as the productive resources of the country at large; and the beneficial influence of forests in a physical, economical, and hygienic aspect is now receiving more of the attention its importance deserves. The countries bordering the Mediterranean—Spain, France, Italy, and Turkey—have all suffered in a marked degree from the reckless and wholesale destruction of the woods which covered the mountain slopes, and many springs which formerly existed under the shelter of the forest have now wholly disappeared. Though the insular position and moist climate of the British Isles save them from suffering from the want of forest in an equal degree with Continental nations, the Anglo-Saxon race has been slow to apprehend the value of the forests with which nature has so liberally clothed the earth, and the history of North America, South Africa, Australia, and New Zealand bears testimony to the same improvidence and need of consideration. There can be no doubt that one of the causes of the terrible famines in India and China is the unwise denudation of mountain slopes, where the forests formerly absorbed a large portion of the rainfall, which now quickly runs off to sea and is lost.

In Europe, as well as in the United States, it has long ago been pointed out that the reckless devastation of forests would not only cause a future want of all the materials the woods are producing for us, but also bring about climatical changes disastrous to agriculture and the general welfare of the population. The conditions favorable for a fulfillment of such dangers no doubt are growing with the increase of the world's population and with the greater requirements of an advancing civilization. It has been claimed that the tendency of nature to clothe waste places with a growth of timber, was sufficient to restore the ravages made by the ax of man. This assertion is as far from the truth as it would be to claim that the earth would yield enough food for its population without our toil, aided by plows and fertilizers. It requires a careful management of our still existing forests, the laying out of new ones, the jealous protection of both, in one word, an approved system of forestry, to preserve wood in sufficient quantity for the use of the human race.

#### UNITED STATES.

The forest area of the whole United States, excepting

Alaska, at the present time has been reported by the Forestry Division of the United States Agricultural Department as less than 500,000,000 acres (489,280,000). Now, a large part of this area hardly deserves the name of forest, because it consists mainly of waste brush land and of tracts which are very thinly stocked with trees. Leaving out of consideration the forests of the Pacific slope (amounting, it is estimated, to 60,000,000 acres), the balance of forest land in the United States cannot long meet the demands on its resources. We have no reliable statistics from which the stock on hand could be even approximately computed for the whole extent, but we know tolerably well the quantity of lumber and wood annually required by our population. In round numbers this amounts to about 20,000,000,000 cubic feet, made up from the following items computed from figures of the Bureau of Statistics:

|                                     | Cubic Feet.    |
|-------------------------------------|----------------|
| Lumber market and manufactures..... | 2,500,000,000  |
| Railroad construction.....          | 360,000,000    |
| Charcoal.....                       | 250,000,000    |
| Fences.....                         | 500,000,000    |
| Fuel.....                           | 17,500,000,000 |

To this amount we may add the annual destruction of wood by forest fires, not less than 10,000,000 acres of woodland being burnt over every year, intentionally and unintentionally. Not only is the young growth destroyed by these fires, but the capacity of the soil for tree growth is diminished. The present reckless method of turpentine getting also injures large quantities of timber unnecessarily. Then come the wasteful methods employed in lumbering, especially by the tie-cutters, who, for example, in the redwood of California, waste timber to the value of \$1.87, to produce a railroad tie worth thirty-five cents. We will not attempt to compute what an amount of forest products will be required by the country a hundred years hence, but that this amount must enormously increase with the growing population is self evident, and that our forests, if a radical change in their management does not take place in the near future, will not supply our wants fifty years hence, cannot be contested. The average yearly growth of timber upon the entire forest area of the United States cannot with any certainty be calculated, our information being too scanty, but, while the capacities of the soil, climate and indigenous species of our country are greater than those of Europe, yet in their present condition, our forests do not compare favorably, in regard to annual yield, with the well-cared-for and well-stocked continental forest areas. The average yearly accretion per acre in German forests has been computed at 50 cubic feet, or on every 100 cubic feet of standing timber, 2.3 cubic feet of new wood yearly. These figures, applied to our present requirements, would show us that an area of not less than 400,000,000 acres must be kept in well stocked forest, to give us a continued supply for our present needs. We have therefore come to a point where increased drain means a squandering of capital, and where regard to the husbanding and careful management of our forests is required for the purpose merely of furnishing raw materials. If we inquire into the supply of certain kinds of timber we will be amazed to find out how the best and most useful trees of our forests are being thinned out, and even threatened with entire extirpation. Take for example the White Pine (*Pinus strobus*). A hundred years ago Maine, Vermont, New Hampshire, New York and Pennsylvania could boast of vast forests of this splendid tree. West of the lakes, Michigan, Wisconsin, and Minnesota, so late as fifty years ago, were covered with forests, and the predominating tree was the White Pine. To-day Maine gives us some spruce and a little small sapling pine, such as would hardly have been sent for firewood in her palmy days of lumbering. Vermont,



New Hampshire, and New York may still boast an occasional clump of trees, but their fate will soon be the same as that of the Indian that used to dwell in their shade. Pennsylvania has a few hundred million feet on the sides of the Alleghanies, but has dropped out of the list as a lumber producer. East of the great lakes nothing remains save hemlock and hard wood, and these in very limited quantities, insufficient to supply the home demand in a majority of localities. Michigan, Wisconsin, and Minnesota are the last remaining resorts for lumbermen east of the Rocky Mountains. Originally there was probably 150,000,000 feet B.M. in Michigan, but the supply has been reduced to from twelve to twenty billion feet, with an annual average cut for the past five years of not far from four and a half billions; and the cutting is so close as to exterminate all the pine timber on the tract operated upon. Wisconsin can hardly be estimated at over thirty to thirty-five billions, little more than would suffice to supply the consumption of the United States as a whole for one year. Minnesota, if allowed to have 10,000,000,000 feet at the present time, could furnish but one year's supply for the mills of the northwestern pine-producing states. In fact, if the mills of the three states were run to their capacity for six years, there would be but little pine left for the seventh year's production. And these estimates of timber include the red or Norway pine, which forms a considerable percentage of the whole. The time is not far distant when our timber supply will have to be brought from the farthest west; in a few years the woods of Alaska will be alive with timber seekers. Already have the woods of Oregon, California, and Washington Territory been the subject of research, and large amounts of eastern capital have been invested there. If ever the forest districts of the east, that have been so ruthlessly stripped of their trees, shall come to some importance again as furnishing wood, the government will have to take speedy and wise measures for protecting and encouraging timber culture.

In the south the destruction of forests has not kept pace with that in the north, and the supply there can, as yet, easily fill the demand, but the recent impetus of trade makes itself felt also in the increased use of timber, and, if the government does not intervene with protective measures, the long-leaved and loblolly pine of the south will succumb to the same fate as the white pine in the north.

*Building Material.*—If we want to ascertain how long the white pine timber supply in the several States is going to last at the present rate of cutting, we evidently can come to practical conclusions only by calculating for the country as a whole, and by keeping in view the aggregate supplies of at least the white pine spruce, hemlock and Southern pine areas and the demand upon them. Taking the estimates of the census of 1880 as a basis, and, to avoid any danger of an underestimate, adding one-third to the amount of the above-named timbers reported as standing, we find that in round numbers 600,000,000,000 feet B.M. might be considered then standing, making the exhaustion of Eastern-grown building timber supplies appear reasonably certain within the next fifty years. The additional supplies of redwood and other Pacific-coast timbers will hardly compensate for timber destroyed by fire, as well as for the drafts on Northern hemlock for tanbark, and on Southern pine for turpentine orcharding, and for the additional requirements of the growing population. On a second growth of white pine in the New England States, we can barely rely for building material, because the saplings are mostly cut when only fit for box boards. Now, as the white pine reaches the requisite qualities for good building material, only after a growth of ninety years, and the long-leaved pine even

requires two hundred years for the same purpose, it is evident that the new spontaneous growth of this class of material is infinitesimal when compared with the demand. The hardwood forests, although they have suffered great reduction in some localities, are not so much exposed to destruction on account of their natural reproductive power; still, there are complaints heard of the growing deficiency of suitable supplies for manufacture. No doubt the enormous yield of the forests of the Pacific slope will for some time furnish timber enough for our demand; but if attacked under the same conditions as the forests of the northwest, once considered "inexhaustible," they also will have to share the same fate. Of the forest area of the Rocky mountains, we cannot expect any greater timber supply than the local consumption demands. But the existence of the forest serves a far more important purpose, in forming a water reservoir for the use of the agricultural lands below during dry seasons. A large part of the forests of Southern California and of other mountainous regions belongs to the same category, and should be managed and utilized with a view to the interests of the agricultural lands below.

The import of forest products from Canada forms the bulk of our importation, amounting to \$9,355,736 for the year ending June 30, 1885, equal to round 75,000,000 cubic feet. Almost the entire cut of the province of Ontario comes to the United States. In Canada there can be little doubt that all the possibilities are strained to the utmost. Since the pine lands of the Northwestern territories have gradually been depleted, the export from Canada does not, as before, go almost exclusively to Great Britain and the West Indies, but almost half of Canada's exported forest products comes to the United States. The visible supplies of white pine in Canada are, according to H. G. Joly, member of the dominion council of agriculture, almost in the same deplorable condition as those in the United States and the prospect of supplying our needs by importations from Canada, therefore, is not encouraging.

The greater part of timber lands still in the hands of the United States Government are situated in the mountain regions of the Northwest, and the area it covers is estimated at about 73,000,000 acres. We have no trustworthy information about its condition, exact extent and location. No attempts have been made at forestry management, and in the disposal of land all adequate distinction with a view to aiding in the development and settlement of the country is more or less neglected.

The laws relating to the protection of the forest domains are either inadequate, or, for want of execution, ineffective. Depredations, amounting annually to many millions of dollars, therefore, are continually perpetrated, and that, to a great extent, under pretext of privileges granted to certain corporations or persons by the government to stimulate and aid development.

It is of importance by whom the bulk of the once endless forest area now is owned. Private persons and corporations such as railroad companies to whom the land was granted by the general government, mine owners, charcoal iron works (holding about 3,500,000 acres), tanneries and other industrial establishments form part of the owners. The largest amount is in the hands of lumbermen, speculators and farmers. The last ones, no doubt, are the most desirable proprietors, since they can devote the most care and attention to the management of their forest property. In the census year nearly 39 per cent. of the reported forest area, comprising 190,255,744 acres, was in the hands of the farmers. This area is somewhat increased by the planting of trees and groves, especially in the Western States.



New England, with the exception of Maine and New Hampshire, has nearly its entire forest area in the hands of farmers, and as the Maine lumbermen have begun a more rational working of their remaining forest land, that State may be considered equally safe. Also the Northern Atlantic States, New Jersey excepted, show a quite satisfactory percentage thus safely owned. In the South the farmers have more than half of their farms in forest, and it is to be hoped that they will not part with this portion of their property to speculators as easily as developments of the last few years have led us to anticipate. In the prairie States much land is still unsettled, and will finally belong to the farmer, greatly increased by the artificial plantations which are more and more spreading over the treeless plain.

The danger appears greatest in the mountain regions, and the only hope existing for the forests there rests in a protective policy of the State or national government. Not less pressing is the danger on the Pacific slope. The timber and stone acts making an easy acquirement of small parcels of timber land possible, opened a more ready means of speculation in the timber of these important mountain forests. Their destruction consequently is imminent, unless warded off by the intervention of the government.

Great additions to our forest area could be effected if the farmers would plant the unimproved land in farms, which, at least in the eastern half of the continent, represents soil of little value, with trees. In the prairie States this class of soil represents about 30 per cent., which, properly put into forest, would increase in prospective value, and improve the conditions of the neighboring field far beyond the cost of such artificial forestry.

*Forest Planting and Management in the United States.*—There exist but very few extensive artificial forest plantations in the United States. In the Western, especially in the prairie States, there is an abundance of small groves which must amount to quite a considerable area, offering some bright prospects as regards the creation of new forests; but for the remaining natural forests there are no such hopes to be entertained. Hardly any attempts are made by the government, whether general or State, at rational forest management beyond the rarely enforced rules in regard to cutting on government land, alluded to below.

There remain to be mentioned a few experimental plantations at several agricultural colleges, which might prove valuable in the future as ready means for instruction in forestry, when this science shall form part of their curriculum.

*Government Action in Regard to Its Own Lands.*—The general government, through the Land Office, appoints special timber agents to protect its timber domain. Their duty consists in "enforcing compliance with the several laws relative to protection and preservation of public timber and the rules and regulations described thereunder by the Department of the Interior." It is not the purpose of the law to deprive actual settlers of the use of so much of the public timber as they need for agricultural and domestic purposes, but to prevent its being made use of by speculators for the gain of a few to the detriment of the many, or its wanton waste and destruction. The agents are not clothed with police powers, but simply act as informers and legal attorneys; they moreover lack the desirable coöperation of the resident population, and it is not therefore to be wondered at that their services are not by far as efficient as they might be, or as the importance of the matter involved justly demands. But few of the individual States hold or control any lands, unless it be school lands granted by the general government. Some States have taken

decided action for the purpose of protecting their remaining forest property.

*Legislation.*—Legislation in regard to forestry may be considered under the classification of restrictive, protective and stimulative legislation. Laws of the first and second class have been passed from an early period with the design of preventing indiscriminate cutting of timber, and of prohibiting the unauthorized cutting or injuring of timber, whether growing upon private lands or those belonging to the government. At present there exist no laws in any of the States restricting the use of forest property by the owner.

Protective laws, directed against theft or destruction of timber are found in the codes of all the States and Territories, but they effect little protective influence, because they are worded in terms too vague and allowing the defendant too many means and ways of escaping their enforcement. Other difficulties also tend to make such laws ineffective.

To encourage forest planting on the treeless prairies, the general government made tree planting, under certain regulations, the consideration for the acquisition of public lands. One quarter-section, or an equivalent fraction, was to be planted and kept in growing condition for eight or more years, and to show 675 living trees per acre at the time of proving up, in order to give title to the whole. According to the report of the General Land Office, the lands taken up under this act at present (1888) comprise 40,000,000 acres, of which about 653,000 have been finally entered for proof or have passed into the hands of settlers.

*Arbor Day.*—Among the encouragements of forestry the establishment of what is known as *Arbor Day* deserves mention. Nebraska enjoys the credit of the inauguration of a day specially devoted to tree planting. In January, 1874, the State Board of Agriculture of that State passed a resolution by which the second Wednesday of April in each year was dedicated to the work of planting trees. The population gave the resolution their ardent support, and it has been claimed that on the first Arbor Day and during the year 1874, more than 12,000,000 trees were planted, and that there are now 100,000 acres of planted forest in the State. In Iowa, Arbor Day was adopted already in the same year by the State Horticultural Society, and some time after established by legislative enactment. In Michigan, the governor proclaimed Arbor Day in 1876; in 1881 it was formally established by the Legislature. In Minnesota the State Forestry Association proclaimed it, 1876, and that very year 1,500,000 trees were reported as planted. The day is now established by law. In Ohio, Arbor Day was established by the Legislature in 1882. West Virginia extensively adopted it in the next year, and it was proclaimed in New Jersey in 1885. It was adopted the same year in Massachusetts and New Hampshire by the action of the State Granges of the Patrons of Husbandry, and has been adopted more recently by the Legislature of these States. New York, Maine, Connecticut, Rhode Island, Pennsylvania, and Florida adopted the day in 1886, and since, also, Vermont, Georgia, Wisconsin, Colorado, and Indiana. Arbor Day received wider interest and significance since the pupils of the public schools were engaged in its observance, for thus the way has been opened for getting the facts relating to tree growth, and the practical use of trees, before the minds of old and young alike. It is this educational aspect which makes Arbor Day a specially desirable means of forestry reform.

*Forestry Associations.*—The first forestry association is probably that of Minnesota (1873), which, with State aid previously granted, can show considerable success in encouraging tree planting in Minnesota and other



States. The American Forestry Congress, in which the Forestry Association was also merged, was formed in 1882, and since then has met yearly in different and widely sundered localities, for the purpose of arousing public interest in the subject and promoting the formation of local forestry associations, as well as to forward any measures of desirable legislation looking to the protection and preservation of forests, and by publishing from time to time its proceedings to diffuse information on the subject. As a consequence of the acting of the forest congress, local or State associations have been formed in several States. The most recent action of associated interests in forestry is reported from the State grange of Maine, embracing a membership of 15,000 farmers, which, by the appointment of a Committee on Arbor Day and Forestry, has committed itself to the subject.

*Instruction in Forestry.*—As regards instruction in forestry, America is vastly behind Europe, where forestry long since has been developed as a science which takes its rank beside the rest taught at colleges and universities. There are actually no schools of forestry in the United States. In some of the agricultural colleges the professor of botany has the title, "and forestry" added, but if he ever lectures on forestry at all, he does so incidentally. At the University of Pennsylvania lectures on forestry subjects have occasionally been delivered, in accordance with the provisions of the "Micheaux Fund." A conception that forestry is a distinct branch of economics, and not identical with tree planting, has not yet found entrance in our educational institutions. On almost the same level with the instructions in forestry is also the literature on the same subject in this country. The only periodical devoted to forestry, the *American Forestry Journal*, had to be abandoned after one year's issue for lack of support.

#### EUROPE.

*Great Britain and Ireland.*—The British Isles were formerly much more extensively wooded than at present. The rapid increase of population has led to the disafforesting of woodland; the climate requires the maintenance of household fires during a great part of the year, and there has been an increasing demand for arable land; these along with the extension of manufacturing industries have been the chief causes of the diminution of wood. The proportion of forest is now very small, and yields but a fraction of the required annual supply of timber, which is imported with facility from America, northern Europe, and the numerous British colonies.

*Norway and Sweden.*—The peninsula formed by the kingdoms of Norway and Sweden is abundantly wooded. Of the vast area of waste land returned as forest in Norway, about one-ninth belongs to the State or various State institutions. In the greater part of the forests the population have a long established right for grazing, timber, and firewood; and even in tracts in which land-owners or the State have a part ownership, the rights of the population, if they have any, take precedence of all other claims. Communal forests are managed by men chosen among those who jointly own them. From the sixteenth century various laws attempted to regulate the private forests, but these were found vexatious, and were repealed in 1836. The forest department for the control of State forests consists of twenty-seven officers, with a very large staff of men employed in felling and timber transport. The export of timber from Norway is chiefly from the Skeen Fiord, and the various ports between Cape Lindesnaes and the Swedish border. Of the 100,500,000 acres in the kingdom of Sweden, 88,800,000 were officially reported, in 1875, as forest waste land, 12,000,000 being public,

and 76,000,000 private property. Only about half of this, however, is really covered with wood, including plantations formed in recent years. Forest management in Sweden is in course of progressive development, and the administration is conducted with energy. The department consists of a director and 700 men of different administrative and executive grades.

*Denmark* is one of the most poorly wooded countries in Europe, the percentage of woodland being now only 4.25 of the whole area. This small proportion is caused chiefly by the nakedness of the western part of Jutland, where the west winds have seconded the action of man in destroying the forests. Much of the wood which at one time covered nearly the whole of Denmark having been cut down, to make way for agriculture, and to supply fuel and timber, a vast area thus bared has become a sandy heathy desert.

*Holland*, on account of its formation and climate, possesses no indigenous forests. There is, however, along the roads and embankments, a considerable amount of timber, consisting of beech, poplar, willow, and ash, which attain a large size, and in the management of such avenues the Dutch excel. Elms also thrive on the embankments. The extensive dunes, amounting to 140,000 acres, are planted chiefly with hardy conifers (Marsh).

*Belgium.*—The physical features of Belgium are, except in the northern part, very different from those of Holland. The chief forests are in the districts of Brabant and Flanders, and the old forest of Ardennes still extends along the southeastern frontier. According to Siemoni, in 1872 Belgium had 18 per cent. of her soil covered with wood. Recent returns give the area of state forest in Belgium as nearly 75,000 acres, and of communal forests, 300,000 acres, all being under government control.

*Germany* is in general well wooded, the forests of Prussia being estimated to cover 23.35 per cent. of the whole surface; while Würtemberg has 31.22, and Baden 35.90. This wealth is partly due to the abundant natural supply, and partly to the methodical way of treating forests adopted by all the states of the empire. The winters being long and severe, an abundant supply of fuel is almost as essential as a sufficient supply of food. This necessity has led, in the absence of coal, and along with a passion for the chase, to the preservation of forests, and to the establishment of an admirable system of forest cultivation, almost as carefully conducted as field tillage. We need only enumerate a few of the principal wooded tracts bordering on the Rhine and the Elbe. The Black Forest stretches the whole length of the grand-duchy of Baden and part of the kingdom of Würtemberg, from the Neckar to Basel and the lake of Constance. The forest of Rippoldsau, on the headwaters of the Kinzig, is one of the best forests, and is managed with great care. In the grand-duchy of Hesse, the Odenwald range of mountains, stretching between the Maine and the Neckar, contains the chief supply of timber. These two large tracts of forest are favorably situated with respect to water carriage, and from them the supply of timber for exportation is mainly drawn; it is now, however, so much diminished in passing down the Rhine through populous districts, that it no longer suffices for the demands of the Dutch shipbuilders. The largest spars are called "Hollander." In the duchy of Nassau there are the large wooded tracts of the Westerwald and the Taunus mountain ranges, and the forests cover a large area extending between Neuwied and Bieberich. In Rhenish Prussia the valuable forests nearly equal the arable land in extent. These lie partly in the Ardennes, on the border of Belgium, and on the mountains overhang-



ing the Upper Moselle, but they do not furnish such stately trees as the Schwarzwald or Black Forest and the Odenwald. The Vosges forests were ceded to Germany in 1872, after the Franco-Prussian war. The Spessartwald, near Aschaffenburg-on-the-Maine in Bavaria, is one of the most extensive forests of middle Germany, containing large masses of fine oak with extensive plantations of coniferous trees, spruce, Scotch fir and larch. Bavaria possesses other fine forest tracts, such as the Baierischewald on the Bohemian frontier, the Kranzberg near Munich, and the Frankewald in the north of the kingdom. North Germany has extensive forests on the Hartz and Thuringian mountains, while in East Prussia large tracts of flat ground are covered with *Pinus sylvestris*, *Abies excelsa*, and juniper.

Much has been done in Germany to preserve and develop the forest resources by establishing training schools, with the result that silviculture has been most accurately studied, and the economical management of woodland most successfully carried out in that country.

*Austria.*—Austria, including Hungary and Bohemia, possesses a vast amount of timber, about one-third of the productive area being returned as woodland, and covering 66,000 square miles, situated more in the east than in the west. There are 2,330,000 acres of forest belonging to the state, chiefly in Croatia, Slavonia, Transylvania, and the Alpine regions throughout the empire. Dalmatia and Istria alone have a deficient supply of timber, owing to previous devastations; but the government is here making great efforts to restore the forests.

*Russia.*—The inequality of the distribution of wood in the Russian empire is very remarkable. The north of Great Russia, the government of Perm, and Finland have a large proportion of forest land, and the export of timber from Archangel, St. Petersburg, and Riga is very great. In central Russia there are also large and valuable forests, but in the south they become scanty. It was recently reported at the annual meeting of the geographical society of Vienna by Councilor Wex, that the Volga is decreasing in volume owing to the destruction of wood in its valley, so as to affect materially the level of the Caspian Sea and Sea of Aral. With the exception of Bessarabia and the Caucasus, including the region southwest of the Caspian, the southern districts of Russia bordering the Black and Caspian Seas are extremely bare of wood, and for household fuel the people use a compost of straw, leaves, etc. The government has attempted the planting of portions of the vast steppes, and near Odessa there are fine plantations of *Ailanthus glandulosa*, which give promise of success to further plantings (Marsh).

In the Paris Exhibition Report, 1867, the area of forest in Finland is given at 2,500,000 acres, but in the most accessible parts wasteful and serious denudation has taken place.

*France.*—The principal timber tree of France is the oak, and various species are much cultivated. The cork oak is grown extensively in the south and in Corsica. The beech, ash, elm, maple, birch, walnut, and poplar are all important trees, while the silver fir and spruce form magnificent forests in the Vosges and Jura Mountains, and the Aleppo and maritime pines are cultivated in the south and southwest. About one-seventh of the entire territory is still covered with wood.

Forest legislation took its rise in France about the middle of the sixteenth century, and the great minister Sully urged the enforcement of restrictive forest laws. In 1669 a fixed treatment of state forests was enacted,

and in 1750 Mirabeau estimated the woodlands in France at seventy millions hectares. Duhamel in 1755 published his famous work on forest trees. Reckless destruction of the forests, however, was in progress, and the Revolution of 1789 gave a fresh stimulus to the work of devastation. The usual results have followed in the frequency and destructiveness of floods, which have washed away the soil from the hillsides and valleys of many districts, especially in the south, and the frequent inundations of the last fifty years are no doubt caused by the deforesting of the sources of the Rhone and Saone. Laws were passed in 1860 and 1864, providing for the reforestation, "reboisement," of the slopes of mountains, and these laws take effect on private as well as state property. Beneficial results have already ensued. Thousands of acres are annually planted in the departments of Hautes and Basses Alps; and during the summer of 1875, when much injury was done by floods in the south of France, the Durance, formerly the most dangerous in this respect of French rivers, gave little cause for anxiety, and it is round the headwaters of this river that the chief plantations have been formed. While tracts formerly covered with wood have been replanted, plantations have been formed on the white shifting sands or dunes along the coast of Gascony. A forest of *Pinus pinaster* 150 miles in length and from two to six broad, now stretches from Bayonne to the mouth of the Gironde, raised by means of sowing steadily continued since 1789; and the cultivation of the same pine in the department of Landes has, along with draining, transformed low marshy grounds into productive soil. With the provinces of Alsace and Lorraine, a large extent of forest was ceded to Germany in 1871.

*Switzerland.*—Forests in Switzerland cover about 18 per cent., or one-sixth of the whole area, but in some of the cantons excessive deforestation has taken place. On the precipitous mountain sides the forest is found to have a powerful influence in preventing the formation and descent of avalanches, and in the Alps the woods are preserved, though insufficiently, by law. A distinguishing feature of Swiss forests is the prevalence of the silver fir, *Abies pectinata*, which covers large tracts on the mountains up to 4,000 feet; the larch is sometimes mixed with beech to 3,000 feet, more rarely with oak and walnut to 1,800 feet, and chestnut to 750 feet. Each canton regulates the management of forests within its own limits; but efforts repeatedly made in the Federal Council for the introduction of a uniform system of forest legislation throughout the republic have not yet been successful.

Vigorous attempts to preserve and restore wooded land are made in some of the cantons, and difficulties in the transport of timber from inaccessible points have been skillfully overcome by the ingenious adaptation of wooden tramways and iron rope slips.

*Italy.*—The kingdom of Italy comprises such different climates that within its limits we find the birch and pines of northern Europe, and the olive, fig, manna-ash, and palm of more southern latitudes. The ascertained extent of wood in 1872, including the wooded island of Sardinia, was, according to Siemoni, 5,025,893 hectares, or about 17.63 per cent. of the entire kingdom, a proportion which might with advantage be greatly increased, but in the latest return it has fallen to 12.34. By the republic of Venice and the duchy of Genoa forestal legislation was attempted at various periods from the fifteenth century downward. These efforts were not successful, as the Governments were lax in enforcing the laws. In 1789 Pius VI. issued regulations prohibiting felling without license, and later orders were published by his successors in the Pontifical States. In



Lombardy the woods, which fifty years ago reached nearly down to Milan, have almost disappeared. The province of Como contains only a remnant of the primitive forests, and the same may also be said of the southern slopes of Tyrol. At Ravenna there is still a large forest of stone pine, *Pinus pinea*, though it has been reduced to a third of its former extent. The plains of Tuscany are adorned with planted trees, the olive, mulberry, fig, and almond. Sardinia is rich in woods, which cover one-fifth of the area, and contain a large amount of oak, *Quercus suber*, *Robur* and *Cerris*. In Sicily the forests have been long felled save the zone at the base of Mount Etna.

The destruction of woods has been gradual but persistent; in the end of the seventeenth century the effects of denudation were first felt in the destructive force given to mountain torrents by the deforesting of the Apennines, and up to the present time the work of demolition continues. According to the statistics published by the Italian Government, in 1870, there were 215,801 hectares of state forest, including woods attached to royal residences, but by the sale, alienation, or destruction of the greater part, the area has since been very greatly reduced.

*Spain and Portugal* are very deficient in woodland. The Peninsula is not unsuited to the growth of timber, as evinced by the noble forests which existed in the time of the Moors, especially in the southern provinces. There was a code of forest laws in Spain in the reign of Philip II., but it seems never to have been carried out, and the fine forests have long since disappeared. The evils of denudation are perhaps nowhere more signally exemplified than in Spain, and Rentzsch even goes so far as to ascribe the political decadence of Spain wholly to the destruction of the forests. Although her physical conditions render a large extent of forest almost indispensable to industrial progress, Spain may be said to be the only European country, with perhaps the exception of Great Britain, in which there has been no provision for the protection of woods.

#### ASIA.

*India.*—The forests of British India are of great extent and value. Under the rule of Hindu and Mahometan princes, as well as in the earlier years of British domination, the forests were recklessly injured by felling, or by the recurrence of destructive fires, thereby deteriorating the climate and impoverishing the people. But conservancy has been introduced in time to preserve many of the advantages they are calculated to afford, to make them a considerable source of revenue to the state, and to provide for the needs of future generations. The change from uncontrolled waste to careful state supervision is necessarily slow: immemorial usages have to be overcome, and many obstructions to be removed, before the department is in good working order; great progress has, however, been made. The forest department is now a branch of the public service, for which candidates are annually selected by the Secretary of State for India.

*Central America.*—Mexico and the various states of the isthmus uniting North and South America, as well as the West Indian Islands, possess abundant forests, which are as yet, however, imperfectly known. But they contain many fine timbers in large quantities, the chief of which, mahogany, *Swietenia Mahagoni*, deserves special notice. The mahogany tree is found on the mainland and in the West Indian Islands between 11° and 20° north latitude.

*Cuba.*—For variety and value the woods of Cuba rival those of the mainland, but the government forests have been neglected and left to chance and plunder. There

has been no attempt to control the misuse, waste and wanton destruction of forest. Valuable timber is felled for making inclosures, and much is burnt.

#### SOUTH AMERICA.

The richness and luxuriance of the tropical vegetation in South America are proverbial, and the whole chain of the Andes is clothed with wood, varying according to elevation, latitude and aspect. Owing to the scarcity and high price of labor, with the few facilities of transport to the seacoast, the timber trade of South America has not as yet reached great dimensions; but with the increase of population and the opening up of the country this commerce will be vastly developed.

*Brazil.*—The great republic of Brazil has forests covering an area half the size of Europe. For 2,000 miles the river Amazon flows through Brazilian territory, and forms with its tributaries the only interruption in a rich level tract measuring 1,200 miles from east to west and 800 from north to south covered with virgin forest.

*Peru.*—In the Montana region of Peru (that is, the extensive area stretching eastward from the Andes to the confines of Brazil) are vast forests, yielding in spontaneous abundance Peruvian bark, india-rubber, vanilla, copaiba, cinnamon, sarsaparilla, ipecacuanha, vegetable wax, etc., but the collection of produce and its transport through the sierra and coast regions to the ports is attended with much difficulty and expense. The region of cinchona trees lies between 19° S. and 10° N. latitude, and between 2,500 and 9,000 feet elevation above the sea. In South America the miserable Governments of the cinchona districts have almost destroyed the inestimable boon with which a bountiful providence has endowed them. Happily, in this case, the energy of such men as Markham, Spruce, and others has in great measure prevented a loss which would have been incalculable; for the cinchona plantations established in India, in Java, and in various other colonies give promise that Europeans will not in the future suffer from the thoughtless greed of the semi-civilized Governments of the Andine States.

*Chili.*—In the inner valleys of the Cordilleras there are estimated to be from 250,000 to 500,000 acres of virgin forest, containing trees of great dimensions.

#### AUSTRALIA.

The large continent of Australia, so far as it has been colonized, is emphatically a pastoral country, and no survey has yet been made of its wood-bearing surface. There are vast tracts in the interior covered with scrub, but the total area of forest-producing timber seems to be comparatively small. The growth of trees is more vigorous in the east than on the north and northwest coasts. The foliage is usually evergreen, and the leaves of many trees hang vertically. The chief forests occupy the flat margins of the rivers, and are composed of species of *Acacia* and *Eucalyptus* mingled with *Callitris* and *Casuarina*, *Banksia*, *Melaleuca*, *Xanthorrhoea*, and *Exocarpus*. The *Eucalyptus* and *Acacia* are said to compose four-fifths of the forests of Australia and Tasmania.

#### AFRICA.

A large extent of the continent of Africa is arid and treeless; the drought in the desert is so great that no tree can resist it. But many parts are now ascertained to be rich in wood, and recent discoveries by Baker, Livingstone, Cameron and Stanley have opened up vast regions where much beautiful timber abounds. The Atlas mountains are covered with magnificent forests, containing eight species of oak, *Pistacia*, *Acacia arabica*, *Cedrus atlantica*, closely allied to, if not the same species as *C. Libani* and *Deodara*, and many other trees.



To the south of the Atlas, on the borders of the great Sahara, are large tracts covered with date palms. The Sudan region has few trees; among these are the baobab (*Adansonia*), tamarind, sycamore, fig, the doom and oil palms, with a few thorny acacias.

#### CLIMATIC INFLUENCE OF TREES.

From this sketch of the principal forest lands of the world it appears that, although the progress of civilization and the increase of population have greatly diminished the area of forests in many countries, they still cover a large portion of the earth's surface, and the necessity of maintaining them is now generally recognized. It is beyond doubt that these vast wooded tracts affect most powerfully the economy of the globe. The direct influences may be summarized from the results arrived at by Humboldt and others: (1) By screening the soil from the heat of the sun's rays; (2) by the immense surface these leaves offer to the cooling process of radiation; and (3) by the copious evaporation of moisture from the leaves. Some of the indirect benefits which thus accrue from the presence of forests may be mentioned, such as the maintenance of equable temperature and humidity, the affording of protection and shelter, the control of the regular flow of rivers, and the supply of perennial springs which fertilize and beautify the country. It is the climatic and physical importance of a due proportion of wooded land, independent of the utility of forest products in innumerable arts which now contribute to our comfort and progress, that has at length awakened most of the civilized governments to the necessity of protecting forests from ruthless spoliation.

FORFARSHIRE, or ANGUS, a maritime Scottish county, washed on the east by the German Ocean, on the south by the Firth of Tay. It has an utmost length and breadth of 36 and 36½ miles, and an area of 890 square miles. The surface is finely diversified, the rich plain of Strathmore—the Howe of Angus—dividing the Sidlaw Hills (1,399 feet) from the Grampian Braes of Angus in the northwest, which culminate in Cairn na Glasha (3,484 feet) on the Aberdeenshire boundary, and exceed 2,000 feet in twenty-two other summits. The chief streams are the North and South Esks and the Isla; and Loch Lee (9 by 2 furlongs) is the largest of several small lakes. The rocks are Silurian in the northwest, and elsewhere Old Red Sandstone; the soils are very various. Somewhat less than half of the entire area is in cultivation, and more than one-nineteenth under wood. Agriculture is practiced on the best methods, and much attention is paid to live-stock, though the celebrated "polled Angus" belongs now specially to Aberdeenshire. Linen and jute are the staple manufactures of the towns. These include Dundee, Montrose, Arbroath, Brechin, Forfar, Broughty-Ferry, Kirriemuir, and Carnoustie. The county returns one member to parliament. Population (1881), 266,360. Part of Southern Pictavia, then till 1242 the *normaer*-ship or old Celtic earldom of Angus, Forfarshire is rich in antiquities—vitrified and other hill-forts, cairns and standing stones, Roman camps, and sculptured stones of Meikle, Aberlemno, St. Vigeans, Glamis, etc., the ruins of Restennoth priory and Arbroath abbey, the round tower and cathedral of Brechin, and the old castles of Glamis, Edzell, Finhaven, Airlie, etc.

FORFAR, a royal and parliamentary burgh of Scotland and capital of the county of the same name, is situated in the valley of Strathmore near the railway from Aberdeen to Perth. Population, 12,817.

FORGE, a fire urged by a blast for the purposes of the smith. Of late years many improvements have been

made in its construction. Formerly the forge was almost made entirely of bricks, and many so constructed exist still. The forge seen in country smithies and in small shops is made entirely of bricks. It is generally built against a wall upon arches to a convenient height. The hearth, which should be made with fire-bricks, is sunk to a depth of three inches or more, according to the nature of the work for which it is constructed; so that the upper and outer course of brickwork forms a rim. About two feet six inches, more or less, above the hearth is placed the hood. This is also made of brick, and is built upon a flat iron rim. It is cone shaped, and at the apex is an orifice leading into a flue for the escape of the smoke. In front of the forge is placed a water tank for quenching the work, tools, etc. The tuyere or twee is placed at the back of the hearth, as well as a small water tank for keeping the nozzle from burning under the action of the severe heat to which it is submitted. A pair of bellows, either single or double, worked by a rocking staff or lever is placed on one side of the forge in a convenient position. The bellows are placed on each side, if the forge be provided with two fires; when this is the case it is called a double forge. Modern or the latest constructed forges are made almost entirely of cast or wrought iron. The wrought-iron forges are as a rule portable for the purpose of ships, dockyards, etc. They are constructed with sheet iron of a suitable gauge, the pieces being riveted together, and generally have the bellows placed underneath the hearth so that it may be out of the way. This particularly applies to portable forges of any description. Cast iron forges (either single or double) are cast in one or two pieces, and are of superior thickness, so as to give strength and solidity. They are used as fixed hearths in shops. They are bricked up when the work is of a very heavy nature so as to support the weight. The hoods of these forges are also made of cast iron, and are bolted on the main casting. They vary in shapes and sizes.

In large smithies the hearths are all placed in a row or scattered about the shops in convenient situations, each having a flue passing through the roof. They are worked by a powerful air blast situated at one end of the building. The air is conveyed by a series of main pipes sunk to the depth of a few feet under the ground. Smaller tubes are employed to convey the blast to the hearths. Under these circumstances the smith has but to turn a small lever, in order to open or close the air-valve, which is placed in a small standard at the side of each hearth. By this means the workman is saved much labor, and consequently much time. Steam has also been adopted as a means of forcing air into the forge. With special apparatus for drying the steam it is very successful. It is, however, more adapted to large blast furnaces than those of the smithy. Another description of the forge is the battery forge. This is used in military service. It is constructed somewhat like a caisson. The bellows are situated in the place usually occupied by the ammunition chests. A box to contain coal, a set of tools, horse shoes, iron and steel is attached to the body of the carriage, which is mounted on a pair of wheels.

FORGERY, in law, is defined as "the fraudulent making or alteration of a writing to the prejudice of another man's right," or "as the false making, or making *malo animo*, of any written instrument for the purpose of fraud or deceit." This definition, it will be seen, comprehends all fraudulent tampering with documents. "Not only the fabrication and false making of the whole of a written instrument, but a fraudulent insertion, alteration, or erasure, even of a letter in any material part of a true instrument whereby a new



operation is given to it, will amount to forgery—and this though it be afterward executed by another person ignorant of the deceit.”

FORGET-ME-NOT, or SCORPION-GRASS (German, *Vergissmeinnicht*; French, *grémillet*, *scorpionne*), the name popularly applied to the small annual or perennial herbs forming the genus *Myosotis* of the natural order *Boraginaceæ*, so called from *μύς*, a mouse, and *οὐς*, ear, on account of the shape of the leaves. The genus is represented in Europe, North Asia, North America and Australia, and is characterized by oblong or linear stem-leaves; flowers in terminal scorpioid cymes (see BOTANY); small ebracteate blue, pink, or white flowers; a five-cleft persistent calyx; a salver or funnel-shaped corolla, having its mouth closed by five short scales; and hard, smooth and shining nutlets. The forget-me-not, a favorite with poets, and the symbol of constancy, is a frequent ornament of brooks, rivers and ditches, and, according to an old German tradition, received its name from the last words of a knight who was drowned in the attempt to procure the flower for his lady.

FORKEL, JOHANN NIKOLAUS (1749–1818), was a native of Coburg in Saxony. As a practical musician, especially as a pianoforte player, Forkel achieved some eminence in his profession; but his claims to a more abiding name rest chiefly upon his literary skill and deep research as a writer and historian in the department of musical science and literature. He obtained the degree of doctor in philosophy, and for some time held the appointment of director of the music at the university of Göttingen.

FORLÌ, the ancient *Forum Livii*, a city of Italy, at the head of a province which was formerly a legation of the Papal States.

FORLÌ, MELOZZO DA, an eminent painter, particularly renowned as the first who practiced foreshortening with much success. He was born, as his ordinary designation indicates, at Forlì about the year 1438; he came of a wealthy family named Ambrosi. In all probability, Melozzo studied painting under Pioro della Francesca, of Borgo S. Sepolcro; he seems also to have been well acquainted with Giovanni Santi, the father of Raphael. It has been said that he became a journeyman and color-grinder to some of the best masters, in order to prosecute his studies; this lacks confirmation. Only three works are now extant which can safely be assigned to Melozzo. (1) He painted in 1472 the vault of the chief chapel in the church of the Apostoli in Rome, his subject being the Ascension of Christ; the figure of Christ is so boldly and effectively foreshortened that it seemed to “burst through the vaulting;” this fresco was taken down in 1711, and the figure of Christ is now in the Quirinal Palace, not worthy of special admiration, save in its perspective quality; while some of the other portions, almost Raphael-esque in merit, are in the sacristy of St. Peter’s. (2) Between 1475 and 1480 he executed a fresco, now transferred to canvas, and placed in the Vatican picture-gallery, representing the appointment of Platina by Pope Sixtus IV. as librarian of the restored Vatican library—an excellent work of dignified portraiture. (3) In the Collegio at Forlì is a fresco by Melozzo, termed the *Pestapepe*, or Pepper-grinder, originally painted as a grocer’s sign; it is an energetic specimen of rather coarse realism, now so damaged that one can hardly assess its merits. Melozzo also painted the cupola of the Capuchin church at Forlì, destroyed in 1651; and it has been said that he executed at Urbino some of the portraits of great men (Plato, Dante, Sixtus IV., etc.) which are now divided between the Barberini Palace and the Campana collection in Paris; this, however, appears to be more than doubtful, and it is even ques-

tionable whether Melozzo was ever at Urbino. In Rome he was one of the original members of the academy of St. Luke, founded by Sixtus IV. He returned to Forlì, probably toward 1480, and died in November 1494. He contributed sensibly to the progress of pictorial art; and, without being remarkable as a colorist, gave well graded lights, with general care and finish, and fine, dignified figures. His works bear a certain degree of resemblance to those of his contemporary Mantegna. Marco Palmezzano was his pupil; and the signature “Marcus de Melotius” on some of Palmezzano’s works has, along with the general affinity of style, led to their being ascribed to Melozzo, who has himself been hence incorrectly called “Marco Melozzo.”

FORLIMPOPOLI, a town of Italy, about five miles east of Forlì, with a station on the railway between Bologna and Rimini.

FORMEY, JOHANN HEINRICH SAMUEL, a German author, was born of French parentage at Berlin, May 31, 1711. He was educated for the ministry, and at the age of twenty became pastor of the French church at Brandenburg. Having in 1736 accepted the invitation of a congregation in Berlin, he was in the following year chosen professor of rhetoric in the French college of that city, and in 1739 professor of philosophy. On the organization of the academy of Berlin in 1744, he was named a member, and in 1748 became its perpetual secretary. He died at Berlin on March 7, 1797.

FORMIA, a town of Italy, in the province of Caserta, beautifully situated near the ancient *Via Appia*, on the innermost recess of the Gulf of Gaëta.

FORMOSA, in Chinese *Taiwan*, a large island in the Pacific lying between what the Chinese call Nan-hai and Tong-hai, or the Southern and the Eastern Sea, and separated from the Chinese mainland by the strait of Fokien, which has a width of about ninety-one miles in its narrowest part.

The inhabitants of Formosa may be divided into three classes:—the Chinese, many of whom have immigrated from the neighborhood of Amoy, and speak the dialect of that district, while others are Hakkas, from the vicinity of Swatow; the subjugated aborigines, now largely intermingled with the Chinese; and the uncivilized aborigines of the eastern region, who refuse to recognize the Chinese authority, and carry on raids as opportunity occurs. The semi-civilized aborigines, who have adopted the Chinese language, dress, and customs, are called Pe-pahwan, while their wilder brethren bear the name of Che-hwan, or green savages. They appear to belong to the Malay stock, and their language bears out the supposition. They are broken up into almost countless tribes and clans, many of which number only a few hundred individuals, and their language, consequently, presents a variety of dialects, of which no classification has yet been effected: in the district of Posia alone, says Doctor Dickson, of the Presbyterian mission, there are “eight different mutually unintelligible dialects.” Mr. Corner, of Amoy, describes the people themselves as of “middle height, broad-chested, and muscular, with remarkably large hands and feet, the eyes large, the forehead round, and not narrow or receding in many instances, the nose broad, the mouth large and disfigured with betel.” The custom of tattooing is universal. In the north of the island at least, the dead are buried in a sitting posture under the bed on which they have expired. Petty wars are extremely common, not only along the Chinese frontiers, but between the neighboring clans; and the heads of the slain are carefully preserved as trophies. In some districts the young men and boys sleep in the skull-chambers, in order that they may be inspired with courage. Many of the tribes that have had least inter-



course with the Chinese, show a considerable amount of skill in the arts of civilization.

FORMOSUS, the successor of Stephen V. (or VI.), as pope, first appears in history when, as bishop of Porto, he was sent on an embassy to the Bulgarians. Having afterward sided with the German faction against John VIII. he was excommunicated, and compelled to take an oath never to return to Rome, or again to assume his priestly functions. From this oath he was, however, absolved by Martin II., the successor of John VIII., and restored to his dignities; and, on the death of Stephen V., in 891, he was chosen pope. The Italian faction had chosen Sergius, and the election of Formosus, which was in opposition to an old rule against the translation of bishops from one see to another, had to be confirmed by recourse to violence, but was rendered secure for a time by the success of the arms of Arnulf of Germany. After the withdrawal of Arnulf, Formosus was compelled to grant the imperial crown to Lambert, son of Guido, of Italy, but this act did not pacify the Italian faction, and Formosus was only released from very hard straits by the arrival of Arnulf, who captured the city in the end of 895. In the following year Arnulf was crowned emperor by Formosus, but before the death of the latter, in May, the excesses of Arnulf and his soldiers had begun to create a strong opposition to the German power amongst all parties in Italy. By Stephen VI. the body of Formosus was disinterred, and treated with contumely as that of a usurper of the papal throne; but Theodorus II. restored it to Christian burial, and at a council presided over by John IX., the pontificate of Formosus was declared valid, and all his acts confirmed.

FORRES, a town of Elgin, Scotland.

FORSKAL, PETER, a celebrated Oriental traveler and naturalist, was born in Sweden in 1736. He studied at Göttingen, where he published a dissertation entitled *Dubia de Principiis Philosophiæ Recentioris*, which gained him some reputation. Thence he returned to his native country; but, in 1759, he alienated the good will of the government by the publication of a pamphlet entitled *Pensées sur la Liberté Civile*. His acquaintance with natural history, however, had gained him the friendship of Linnæus, who recommended him to Frederick V., of Denmark. From that sovereign he obtained the title of professor at Copenhagen, and Frederick also appointed him to accompany Carsten Niebuhr in an expedition to investigate Arabia and Egypt. He died of the plague at Jerim, in Arabia, July 11, 1763.

FORST, originally FORSTA or FORSTE, a town of Brandenburg, Prussia, circle of Sorau, is situated on the Neisse, forty-four miles southeast of Frankfort-on-the-Oder.

FORSTER, FRANÇOIS, a French engraver, was born at Locle in Neufchâtel, August 22, 1790. In 1805 he was apprenticed to an engraver in Paris, and he also studied painting and engraving simultaneously in the École des Beaux Arts. His preference was ultimately fixed on latter art, and on his obtaining in 1814 the first "grand prix de gravure," the king of Prussia, who was then with the allies in Paris, bestowed on him a golden medal, and a pension of 1,500 francs for two years. With the aid of this sum he pursued his studies in Rome, where his attention was devoted chiefly to the works of Raphael. In 1844 he succeeded Tardieu in the Academy. He died at Paris June 27, 1872.

FÖRSTER, FRIEDRICH, a German historian, brother of Ernst Joachim Förster the painter, was born at Münchengrosserstädt on the Saale, September 24, 1791. After receiving his early education in the gymnasium at Altenburg, he studied theology at Jena, but subsequently devoted his attention for a time chiefly to archæology

and the history of art. On the uprising of Prussia against France in 1813 he joined the army, where he soon attained the rank of captain. At the close of the war he was appointed professor of the school of engineering and artillery in Berlin, but on account of certain democratic writings he was dismissed from that office in 1817. He then became connected with various literary journals, and in 1830 undertook with his brother an art tour in Italy. Shortly after his return he received an appointment at the royal museum of Berlin, with the title of court councilor. Förster was the founder and secretary of the *Wissenschaftlichen Kunstverein* (scientific art union) of Berlin. He died at Berlin, November 8, 1868.

FORSTER, JOHANN GEORG ADAM, an eminent German naturalist and writer on scientific subjects, was born at Nassenhuben, a small village near Dantzic, in November, 1754. His father, Johann Reinhold Forster, a man of great scientific attainments but an intractable temper, was at that time pastor of the place; the family are said to have been of Scotch extraction. In 1765 the elder Forster was commissioned by the empress Catherine to inspect the Russian colonies in the province of Saratov, which gave his son an opportunity of acquiring the Russian language and the elements of a scientific education. After a few years the father quarreled with the Russian Government, and suddenly embraced the resolution of proceeding to England, where he obtained a professorship of natural history and the modern languages at the famous nonconformist academy at Warrington. His violent temper soon compelled him to resign this appointment, and for two years he and his son earned a precarious livelihood by translations in London,—a practical education, however, exceedingly useful to the younger Forster, who became a thorough master of English, and acquired many of the ideas which chiefly influenced his subsequent life. At length the turning point in his career came in the shape of an invitation for him and his father to accompany Captain Cook in his third voyage round the world. Such an expedition was admirably calculated to call forth Forster's peculiar powers. He attained no remarkable distinction as an original discoverer or investigator, but his insight into nature was accurate and penetrating; he conceived of her as a living whole, and reproduces her vitality in his animated pages. His account of Cook's voyage is almost the first example of the glowing yet faithful description of natural phenomena which has since made a knowledge of them the common property of the educated world,—a prelude to Humboldt, as Humboldt to Darwin and Wallace. The publication of this great work was, however, impeded for some time by differences with the Admiralty, during which Forster proceeded to the Continent to obtain an appointment for his father as professor at Cassel, and found to his surprise that it was conferred upon himself. The elder Forster, however, was soon provided for elsewhere, being appointed professor of natural history at Halle. At Cassel, Forster formed an intimate friendship with the great anatomist Soemmering, and about the same time made the acquaintance of Jacobi, who inspired him with a mystical spirit from which he subsequently emancipated himself. These were the days of secret societies, masonic lodges, and conventions of illuminati. Forster was for a long time deeply implicated in their proceedings, the purpose of which remains obscure. The want of books and scientific apparatus at Cassel induced him to resort frequently to Göttingen, where he betrothed himself to Therese Heyne, the daughter of the illustrious philologist, a clever and cultivated but heartless woman, who became the evil genius of his life. To be able to marry he ac-



# FORTIFICATIONS.

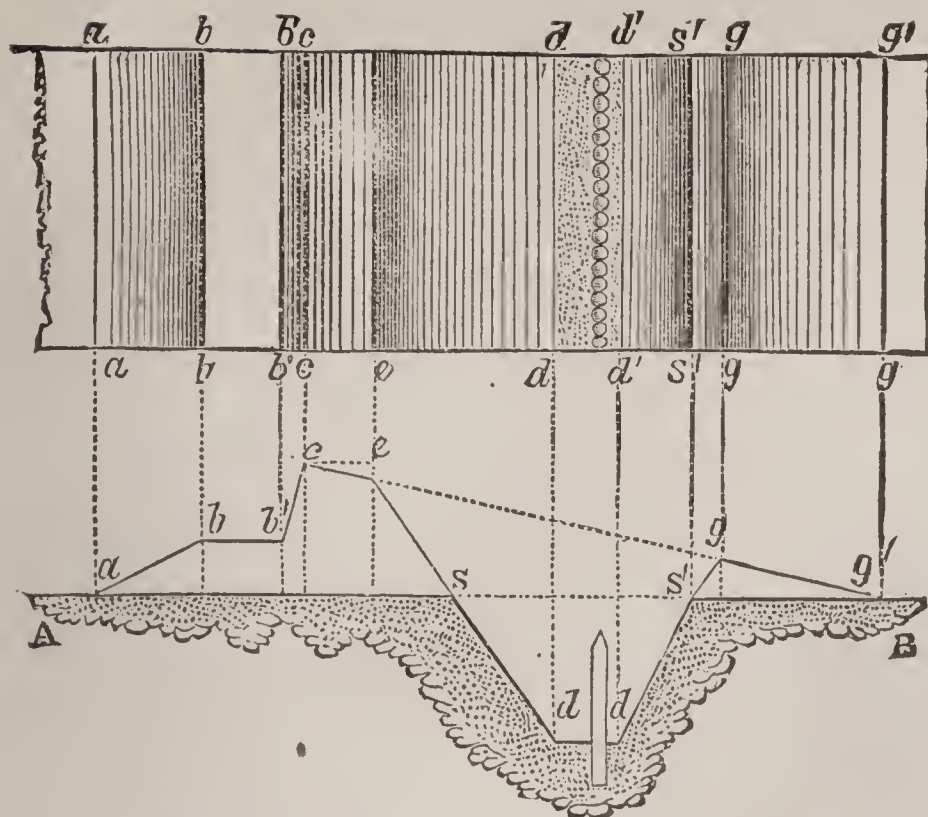


FIG. 1.—Simple Parapet. Plan above, profile below.

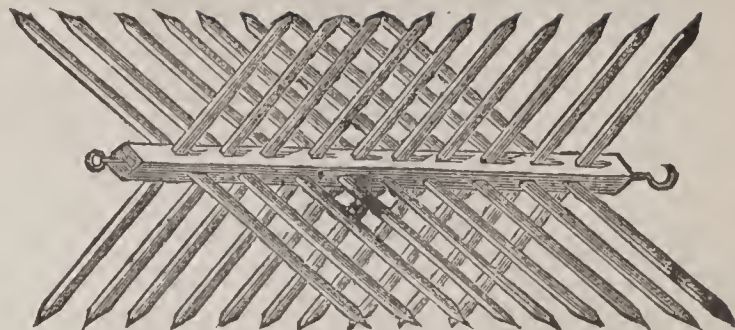


FIG. 4.—Cheval-de-frise.

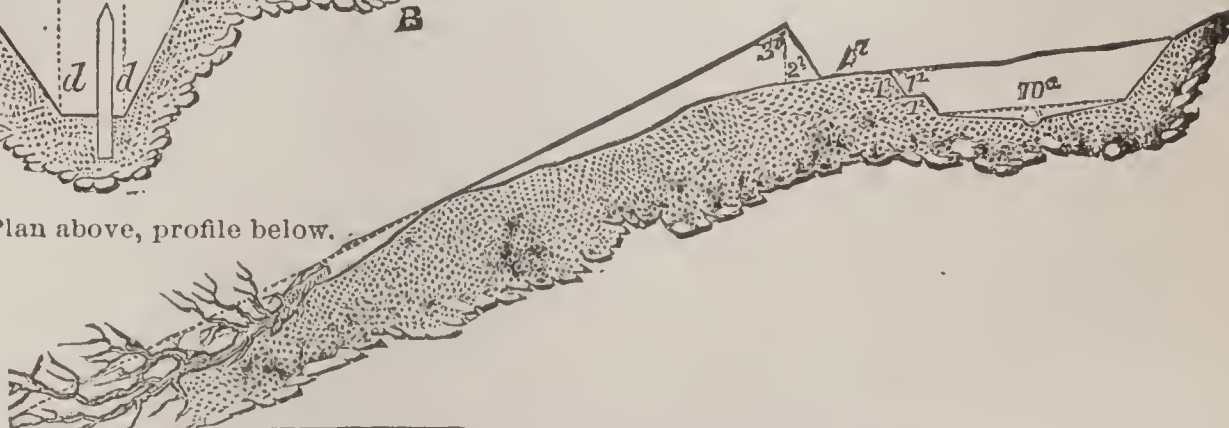


FIG. 3.—Simpler arrangement of Abattis.



FIG. 2.—Arrangement of Abattis.

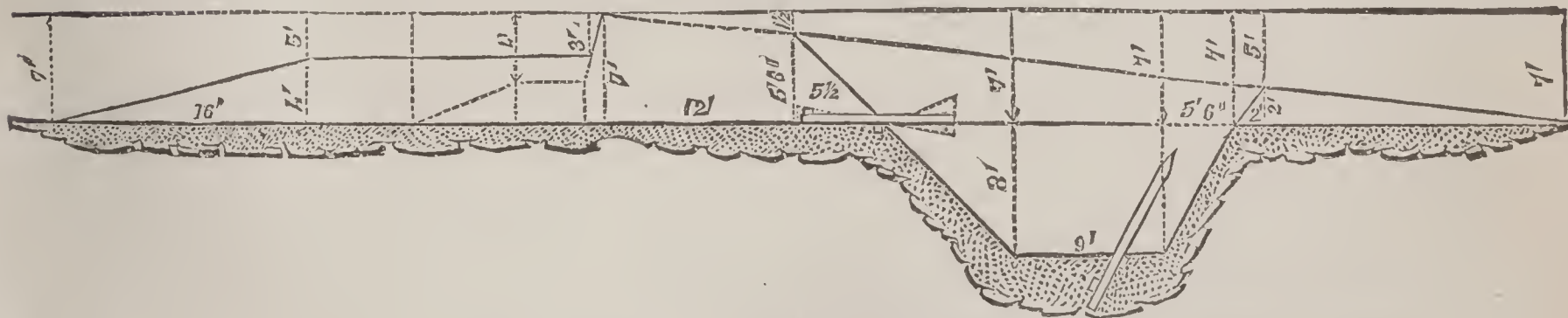


FIG. 5.—Profile showing Fraises on the Escarp.

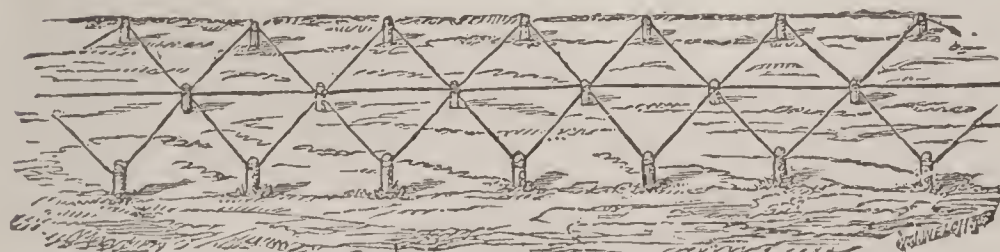


FIG. 6.—Wire Entanglements.

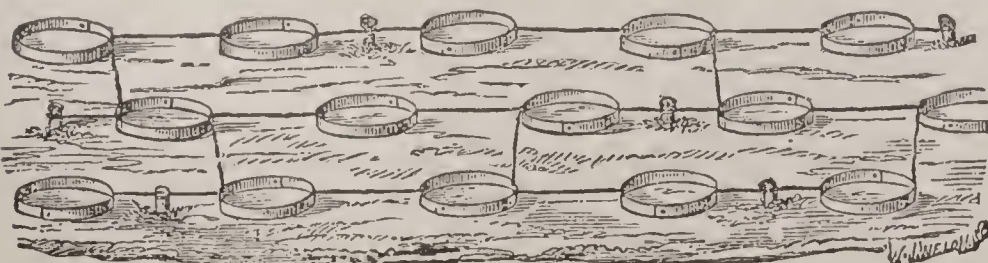


FIG. 7.—Gabions as an Entanglement.

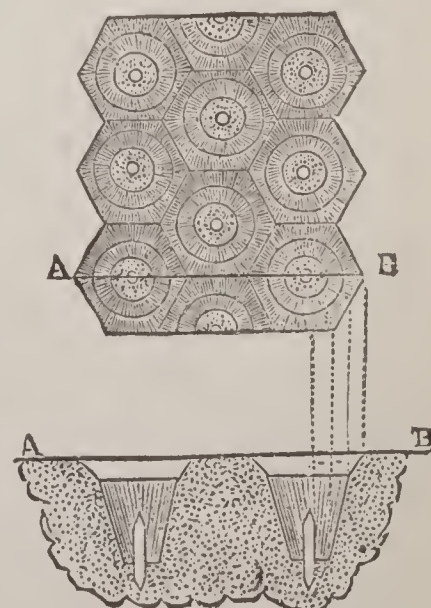


FIG. 9.—Plan and section of Trous-de-loup.



# FORTIFICATIONS.

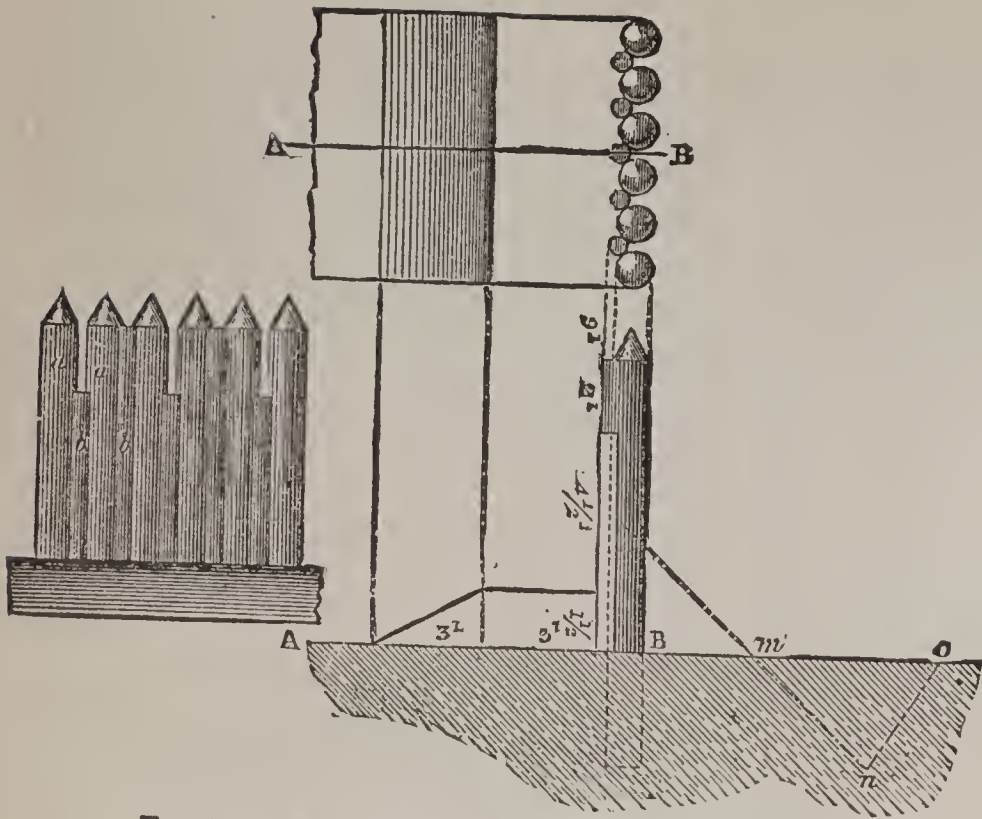


FIG. 10.—Plan, elevation, and section of Stockade.

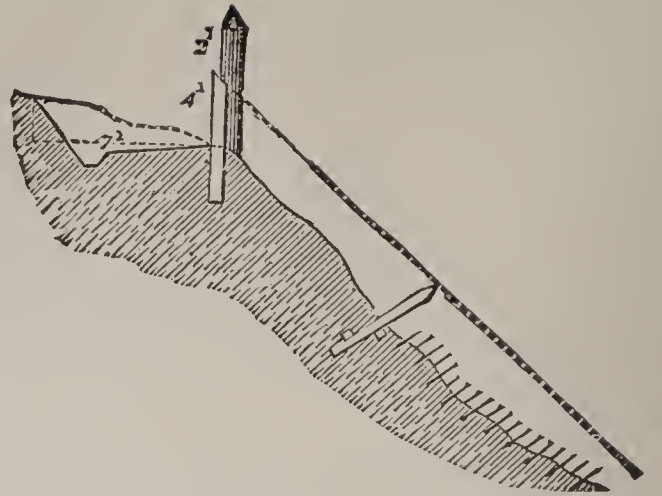


FIG. 11.—Stockade on steep ground.

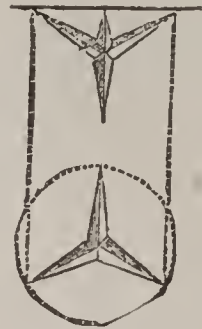


FIG. 8.—Crows' Feet.

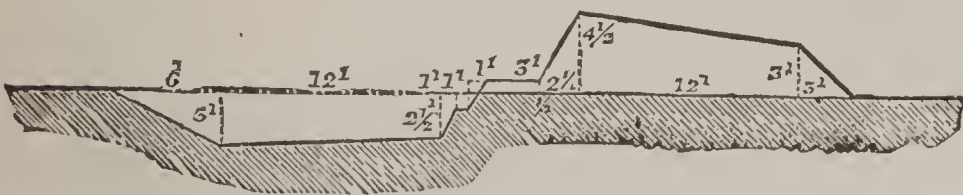


FIG. 12.

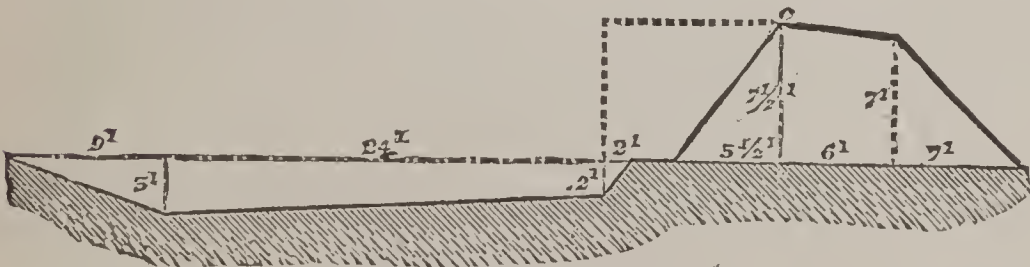


FIG. 13.—Epaulement.

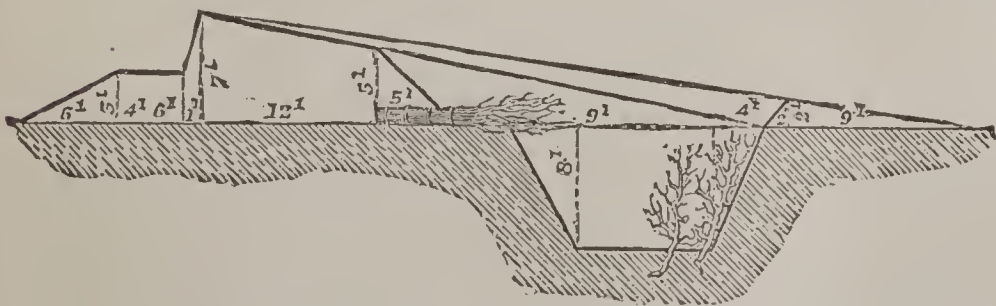


FIG. 14.—Use of Abattis as Fraise and Palisade.

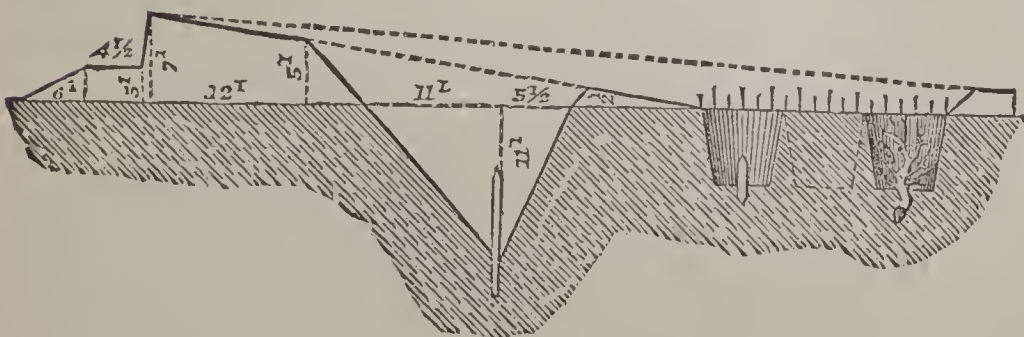


FIG. 15.—Trous-de-loup in front of triangular ditch.



FIG. 23.—Redoubts.

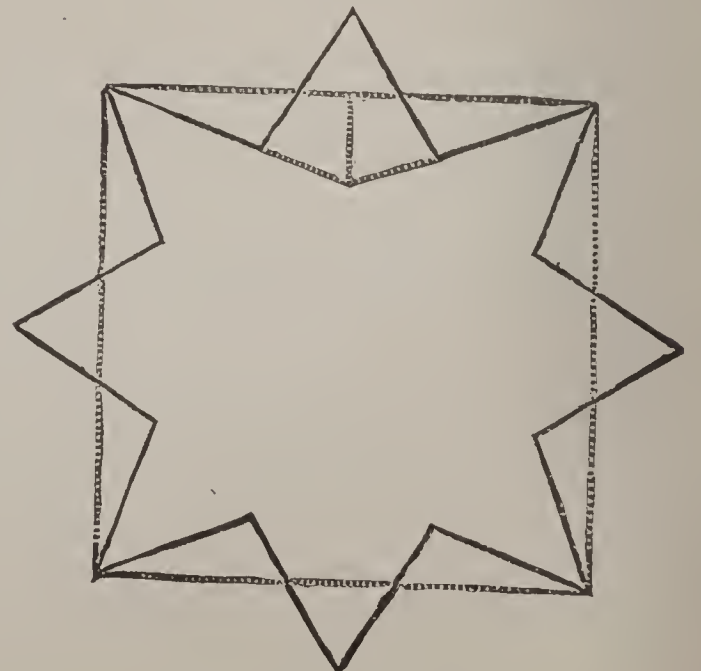


FIG. 24.—Star-Forts.



cepted (1784) a professorship at the university of Wilna, where he found himself greatly misplaced. The penury and barbarism of Polish circumstances are graphically described in his and his wife's letters of this period. After a few years' residence at Wilna he resigned his appointment to participate in a scientific expedition projected by the Russian Government, and upon the relinquishment of this undertaking became librarian to the elector of Mayence. In 1790 he published his travels in the Netherlands, with special reference to the art of the country — a work displaying the same power of exposition in æsthetic matters as he had previously shown in the description of the aspects of nature. This was his last work. The principality of Mayence was now involved in the vortex of the French Revolution, and Forster unhappily suffered himself to be drawn into a position incompatible either with fidelity to his master, the elector, or allegiance to his country. With his liberal sympathies and deficiency in political insight, he might be excused for welcoming the French as deliverers, but in promoting the actual incorporation of Mayence with France, he justly incurred the execration of patriotic Germans, notwithstanding the unquestionable purity of his intentions. Domestic sorrows were added to public calamities; Forster found himself not only deserted by his wife but deprived of his children. It is difficult to determine whether his apparent resignation should be ascribed to romantic self-sacrifice or to the apathy of an exhausted spirit. The situation was nearly the same as that of George Sand's *Jacques*, and the catastrophe not very dissimilar. Forster died suddenly and opportunely, January, 1794, in Paris, whither he had gone as deputy from Mayence in the worst days of the Reign of Terror.

FORSTER, JOHN, an English historian, biographer, journalist, and critic, was born April 2, 1812, at Newcastle, where his father, a member of the Unitarian Church, followed the occupation of a butcher. He was well grounded in classics and mathematics at the grammar-school of his native town, and gave early promise of future distinction. He had not long passed his twentieth year when the publication of his *Lives of Eminent British Statesmen* began. Thenceforward he was a prominent figure in that distinguished circle of literary men which included such names as Bulwer, Talfourd, Fonblanque, Landor, Carlyle, Dickens. In 1843 he was called to the bar by the benchers of the Inner Temple; but while highly valuing this honorable connection with the legal profession, he never became or sought to become a practicing lawyer. His energies were mainly devoted to laborious historical investigations, while relaxation was sought chiefly in lighter forms of literary activity. For some years he edited the *Foreign Quarterly Review*; in 1846, on the retirement of Charles Dickens, he took charge for almost a year of the *Daily News*; in 1847, on the resignation of Albany Fonblanque, he became editor of the *Examiner*, and this post he retained till 1856. From 1836 onward he contributed to the *Edinburgh Quarterly*, and *Foreign Quarterly Reviews* a variety of articles, some of which were republished in two volumes of *Biographical and Historical Essays* in 1858. In 1848 appeared his *Life of Oliver Goldsmith*, which, especially as revised and improved in a second edition (1854), has taken an acknowledged place as one of the most admirably executed biographies to be found in the whole range of English literature. Continuing his original researches into English history at the period of the Revolution, he published in 1860 two volumes, respectively entitled *Arrest of the Five Members by Charles I.—A Chapter of English History rewritten*, and *The Debates on the Grand Remonstrance, with an introductory Essay on*

*English Freedom*. These were followed by his *Biography of Sir John Eliot*, published in 1864, an elaborate and finished picture from one of his earlier studies for the *Lives of the Statesmen*. In 1868 appeared his biography of his friend Walter Savage Landor. For several years he has been collecting materials for a life of Swift, but his studies in this direction were for a time suspended in consequence of the death of Charles Dickens, with whom he had long been on terms of intimate friendship. The first volume of Forster's *Life of Dickens* appeared in 1871, and the work was completed in 1874. Toward the close of 1875 the first volume of his *Life of Swift* was published; and he had made some progress in the preparation of the second, when he was seized with an illness of which he died on February 1, 1876.

FORT DE FRANCE, formerly PORT ROYAL, the capital of the French island of Martinique, one of the smaller Antilles, is situated on the west coast of the island, on the north side of a well-sheltered bay.

FORTESQUE, SIR JOHN, an eminent English lawyer in the reign of Henry VI., was descended from an ancient family in Devonshire, and, in all probability, was born at Norris, near South Brent in Somersetshire, toward the close of the fourteenth century. He was educated at Exeter College, Oxford. During the reign of Henry VI. he was three times appointed one of the governors of Lincoln's Inn. In 1441 he was made a king's sergeant-at-law, and in the following year chief justice of the king's bench. As a judge Fortesque is highly commended for his wisdom, gravity, and uprightness; and he seems to have enjoyed great favor with the king, who is said to have given him some substantial proofs of esteem and regard. He held his office during the remainder of the reign of Henry VI., to whom he steadily adhered; and having faithfully served that unfortunate monarch in all his troubles, he was attainted of treason in the first parliament of Edward IV. When Henry subsequently fled into Scotland, he is supposed to have appointed Fortesque, who appears to have accompanied him in his flight, chancellor of England. In 1463 Fortesque accompanied Queen Margaret and her court in their exile on the Continent, and returned with them afterward to England. During their wanderings abroad the chancellor wrote for the instruction of the young Prince Edward his celebrated work *De laudibus legum Angliæ*. On the defeat of the Lancastrian party, he made his submission to Edward IV., from whom he received a general pardon dated Westminster, October 13, 1471. He died at an advanced age, but the exact date of his death has not been ascertained.

FORTH, one of the largest rivers in Scotland. It is formed of two streams rising to the north of Ben Lomond (one of them passing through Loch Chon and Loch Ard), which unite above Aberfoyle.

FORTIFICATION is the art of strengthening, by works of defense, positions in which it is proposed to place troops so as to render them secure from the attack of an enemy. Such positions may contain within them towns, dockyards, arsenals and ports, or may serve merely for shelter for an army in the field; but the object to be attained is always the same, and the works of defense are so disposed round the position that, while they offer the greatest obstacles to the advance of their assailants, they afford the utmost shelter to their defenders. Fortification is, in short, the art of enabling the weak to resist the strong.

Various terms have been adopted in connection with the general term of Fortification, but none of them are of much use in considering the subject, and some may lead to error, by inducing the engineer to restrict himself under some circumstances to a very limited view of his



subject. Thus Fortification Natural and Fortification Artificial imply a useless distinction, as every engineer must avail himself of the natural advantages or obstacles of ground, as well as of the obstacles his science and genius enable him to add to them; and thus in every Fortification nature and art must act together. Fortification Regular and Fortification Irregular are defective terms, as no Fortification can possibly be regular unless it should so happen that the ground it occupies, as well as the ground surrounding it on all sides, is uniform in level and general character. Again Fortification Permanent and Fortification Field or Temporary have reference only to the immediate object of the works, or to the application of the science, and in no way affect its principles, which remain the same whether the work is a simple earthen entrenchment, or a great fortress surrounded by masonry walls. Fortification Offensive and Fortification Defensive are, however, of all terms the most objectionable, since they imply a contradiction to fact, for the perfection of defense depends as much on its active offensive operations as on the protection of its covering works, while the perfection of attack depends as much on the skill with which its passive protective works are pushed forward as on the fire of its batteries.

Fortify, fortifications, fortress, fort, are all derived from *fortis*, strong; and the idea the first two convey is that, by artificial arrangement, additional strength is bestowed upon one combatant over another, or upon one party of combatants over another party. A rock, the trunk of a tree, a bank of earth, or any natural object, which shelters the body of a man from the missiles of his opponent while it leaves him free to discharge his own, may be considered the simplest form of fortification.

A bank of earth, when reduced to the requisite thickness, and molded into proper form, with such slopes as the particular tenacity of the earth may require to insure stability, or which the intended direction of the fire over its summit may render necessary, becomes a parapet, so called from the Italian words *para*, a defense or guard, and *petto*, the breast, or, in English, a breastwork. If the breastwork or parapet be made only sufficiently high to permit the soldier to fire over it, he will be exposed after firing, and will be forced to crouch in order to obtain cover. The parapet is therefore made high enough to cover the soldier when standing up so that he can load with ease and security, and can move with safety from place to place behind it. This increased height renders it necessary to introduce a banquette or step (accessible by an easy slope), standing upon which the soldier can fire over the parapet and from which he can retire by the interior slope to the lower ground behind it; the name banquette is derived from *banchetta*, a little bench or step. As parapets are usually formed artificially, the earth for their construction is derived from a ditch, which being dug immediately in front of and parallel to the parapet, forms by its depth an additional obstruction to an advancing enemy. Ordinary intrenchments are formed of a simple parapet and ditch, but in more important outworks and in fortresses the height is further augmented by elevating the parapet on another mound of earth called the rampart (*riparo* in Italian), and as this additional height requires a greater quantity of earth, the ditch is made both wider and deeper. By these means the difficulties of attack are increased, additional cover is given to the magazines or other buildings within the fortress, and the command over the country is raised and improved in efficiency, by elevating the soldier so that he can see over the many minor obstacles which would otherwise restrict his field of view.

Some writers, regarding the presence or absence of

the rampart as the main distinction between permanent and temporary works, have proposed to call the former Rampart or Town Fortification, the latter Parapet or Field Fortification; but this distinction is not of universal application, and the more ordinary divisions of Permanent and Field Fortification better indicate the nature of the works and the objects for which they are intended.

In order to study efficiently the combinations of these simple elements, with a view to form from them works of defense, it is necessary that we should know the manner in which such works are represented on paper. As in architecture, of which in earlier times fortification was only a military branch, this is effected by the plan, the section and the elevation, of which the first two are the most important. The plan of a work is the orthographic projection of the lines of intersection of the planes of its slopes on the plane of construction. The elevation is a similar projection on a vertical plane. The section or profile is made on a plane perpendicular to the lines of intersection of the planes or slopes, and, therefore represents the traces of these planes on the sectional plane. Fig. 1 represents a small portion of a simple parapet in plan and profile, and leads to the following explanation of terms:

*Relief*.—This term is adopted to indicate the height of any point of the work either above the plane of construction, which is sometimes the plane of site, when it is called constructive relief, or above the bottom of the ditch, when it is called absolute relief. The absolute relief is a very important datum, as it expresses the total obstruction offered by the parapet and ditch to the ascent of the assailant, and it has a bearing on the regulation of the length of lines, which mutually defend each other. The Relief of a work is the relief of the crest of its parapet. The Command of a work is the height of the crest of its parapet, either above the plane of site if horizontal, or above any point of that plane specially referred to, or above the crest of the parapet of any other work in front of it; the difference of height, therefore, between the crest of the parapet in fig. 1 and the crest of the glacis is the command of the parapet over the glacis; in the one case the command is absolute, in the other relative.

But after all a simple parapet and ditch afford only temporary protection, and it is necessary to stop an enemy as he advances to them by placing obstacles in his path which shall retain him as long as possible under the fire of the works opposed to him either in front or in flank. In the profile in fig. 1, the simplest form of such an obstacle, viz., a Palisade, is shown. When, however, in combination with direct fire only, as in the figure, palisades check an enemy but for a short time, and are principally useful as affording more time to the defenders. Indeed in any combination of defense palisades are now of much less value than formerly, as they are readily destroyed by indirect fire, and by the new explosives which are more portable and far stronger than gunpowder; they are mainly used in closing the gorges of temporary works. Many other obstacles may, however, be so arranged as to assist materially in rendering simple direct fire more effective.

*Abattis* are formed of trees cut down, and arranged side by side with the branches interlaced outward, and the stems inward; the branches should be freed from foliage, and their ends cut sharp. They may be arranged in one or more rows, so that the fire from the parapet shall sweep along their summits, their stems being firmly fastened by pickets to the ground and partly buried in it; an enemy would suffer great loss while attempting to remove them under fire. The best abattis are formed of good-sized growing trees. The trunks are partially cut through a little above the ground, and the trees are



bent down and securely fastened to the ground and to one another by pickets and iron wire.

Fig. 2 exhibits an arrangement of Abattis; and it will be observed that in this profile the exterior slopes of the parapet and the escarp are formed into one gentle slope, while the counterscarp retains its ordinary slope. By this modification the difficulty of descending into the ditch remains as before, and the sloping pickets in front of the abattis prevent the assailants from clearing it away. In simple inclosed works, such as redoubts, and in lines, the defense frequently depends on direct fire alone; and in these cases a work of the profile here figured with obstacles would be far more effective in checking an enemy than a work of ordinary profile without obstacles, and would render it impossible that a watchful garrison should be surprised; and this is a very important consideration, as a vigorous and bold enemy could scarcely be stopped if he had succeeded in arriving at the foot of the escarp unchecked.

Fig. 3 exhibits another arrangement formed only of large branches securely picketed down to the ground. In this case the form of the ground is taken advantage of, and the profile of the defensive line is modified, a trench being cut out behind it, and the banquette being formed on the surface of the ground. By simple arrangements of this kind, it will often be possible to carry defensive lines over a large extent of ground in a short period of time, and to obtain more effective defense by taking advantage of the natural facilities of the ground than by the construction, with a great expenditure of labor and time, of elevated works, not so well fitted to sweep the surface of the ground, and to act upon the obstacles placed to check the progress of the assailants.

*Chevaux-de-frise*.—The Cheval-de-frise (fig. 4) is a substitute for an abattis. It consists of a strong horizontal beam, twelve feet long and nine inches square, through which are passed strong lance-like rods of wood or iron, sharp at both ends, and about six inches apart. Several of these may be joined together by rings and hooks with which the ends of the beams are fitted.

Chevaux-de-frise require a considerable amount of skilled labor in their construction; hence they can only be employed in limited quantities for limited objects. They are employed for temporary purposes, *e.g.*, as barriers to the entrance of a work, across a road or street, in positions where they can be easily removed when the communication is required to be used. They have the disadvantage of being removed or destroyed without much difficulty. It is, however, usual to keep as articles of store iron chevaux-de-frise, so made that the parts are separable for convenience of package and transport. If planted at the bottom of a hollow, exposed to direct fire, so that they must either be pushed uphill forward, or pulled downhill backward, and securely fastened by chains to the ground or to upright posts, they form a very formidable obstacle.

*Fraises* are palisades placed in a horizontal or nearly horizontal position. They are of wood or iron, and are usually made about ten feet long and fifteen inches thick, bound together by two ribbons, nailed above and below them and buried in the ground, without which they would be more easily torn away. They are fixed both on the counterscarp and on the escarp. When on the escarp, they are inclined downward, and the berm is cut away; when on the counterscarp they are inclined upward. On the counterscarp they are safe from direct fire, and retain an enemy outside the ditch.

Fig. 5 represents, in section, a row of fraises on the escarp. In this profile the ordinary banquette for musketry is represented by dotted lines below a wider terreplein, formed for artillery to fire over the parapet,

or "*en barbette*," as it is usually called; but this will be more fully explained below.

The "Wire Entanglement" is the best and most easily made of hasty accessory defenses. It can be applied everywhere, and can be made by anybody; the material of it is carried in a small compass; it does not interfere with the fire of the defense; it cannot be seen from a distance, and artillery has little effect upon it. A form of wire entanglement is shown in fig. 6. Stout stakes are driven into the ground five feet apart, and disposed in rows checker-wise; strong wires are wound round them about one foot six inches above the ground, crossed diagonally by finer wires.

Iron "band Gabions," when disposed as in fig. 7, form a good entanglement. The bands are buttoned and placed in lines four feet apart, and connected together by strong wires passing through the bridging holes.

*Crows' Feet* (fig. 8) are made of iron with four points so arranged that one shall always project upward in whatever manner they may be thrown on the ground; the points are either two or four inches long. Crows' feet are sown over a space about twelve feet broad. Troops coming suddenly, and in the dark, on these obstacles, would be much annoyed by them. They are most effective against cavalry, and were formerly much used—more so than now.

*Trous-de-loup* are holes in the ground in the form of an inverted cone or square pyramid, the sides of which are as steep as is consistent with the stability of the soil. They are made six or eight feet in diameter and six feet deep, so that an enemy cannot use them as shelter pits to fire from. At the bottom is fixed a sharp stake three feet long, or the branch of a tree cut into sharp points, or a number of smaller sharp pickets, or a quantity of crows' feet. Fig. 9 shows, in plan and section, the arrangement of trous-de-loup proposed by Wenzel.

If along the line of a position, either on the glacis or on the escarp (when gradually sloped as in fig. 2), small trees or shrubs are planted, they can be on an emergency cut down, and with the points of their stumps sharpened they would become very annoying to an assailant. Harrows and many other substitutes can also be used; indeed every expedient which ingenuity can suggest should be adopted by the engineer to check the progress of an advancing enemy, and to delay him as long as possible under fire.

*Stockades*.—Before proceeding to the investigation of the principles which should regulate the relief and thickness of ordinary parapets, viewed in reference to simple defensive lines and to direct fire, it is right to notice the "Stockade" as a substitute, and in some circumstances an advantageous substitute, for a parapet. The Stockade is formed of one or more rows of stout palisades, and in its simplest form is thus constructed. A row of very strong palisades, usually pointed at the top, from nine to twelve inches in diameter, is fixed deeply in the ground, with intervals of about three inches between the palisades. These intervals are filled by smaller palisades cut square at the top—every alternate palisade being shortened four and a half inches, so that the open space above it may be used as a loophole. A stout ribbon nailed horizontally to the upper ends of the palisades strengthens the construction materially.

Such a Stockade is shown in plan, elevation, and section in fig. 10; it has a banquette of earth, which may be replaced when desirable by a wooden step. By cutting out the triangular portion shown in the section, and throwing the earth up against the front of the palisades, as indicated by the dotted lines, an exterior slope and escarp are formed which keep an enemy con-



stantly in view. A stockade of this description placed close to the edge of a steep bank, has this great advantage over a parapet, that the men behind it have a more effective command of the ground before them when firing through the loopholes than they could possibly have when firing over a parapet. It is here supposed that artillery fire cannot act directly against the stockade, but artillery may possibly be placed to act against it in a longitudinal direction, or, as it is termed, to enfilade it, and in this case the line of stockade should be interrupted by traverses, which are usually banks of earth placed transversely to the line they are intended to protect from such artillery fire. Fig. 11 shows a stockade of this description applied to the defense of precipitous ground. When stockades are formed into inclosed works, they are called "Tambours."

Under some circumstances it may be desirable to throw an ordinary parapet forward to the edge of a bank, the slope of which supplies the function of escarp, and hence to dig the ditch behind instead of before it, as in fig. 12, where it will be also observed that the slope of the banquette is broken into two steps, the tenacity of the earth when first excavated allowing it to stand firm; the principle of this excavated form of structure is adopted in sunken batteries. Sometimes the object of the parapet is merely cover and not active defense, in which case the banquette is omitted as in fig. 13, and the work is called an "Epaulement." In this profile it will be observed that a space is left between the face of the epaulement and the internal ditch. Such a space should always be left, whether the ditch is within or without, when the work to be formed is of any considerable elevation, as it affords a stage upon which the builders can stand, and lessens the height to which the diggers have to throw the earth from the ditch; it is very important to keep this space clear by throwing forward or backward the earth as quickly as it is raised. The distinguishing characteristic of an able engineer is the power of varying his appliances — thus in his hands the abattis may become the fraise, or may take the place of the palisade, as in fig. 14. If this be not borne in mind, evil rather than good may result from adherence to systematic instruction; as the engineer who has acquired a knowledge of one contrivance may be found crippled by his constant efforts to conform to it rather than to seek some other better fitted to the circumstances of the case. In this profile a berm is represented, as it would be difficult to arrange the abattis and to build the parapets without it.

The arrangement of the trous-de-loup, combined with stakes driven into the ground is shown in fig. 15, an advanced glacis having been formed of the earth thrown out of the excavations. The ditch is in this case triangular; and it is scarcely necessary to add that the particular form of ditch must be determined by the nature of the ground, remembering that the contents of the ditches must supply material for the parapets; and their depth, as it adds to the difficulty of assault, should not be diminished except from necessity.

FIELD FORTIFICATION.—The parapet has been hitherto considered principally in its character as the simplest element of defense, affording at once protection to the soldiers behind it, and obstructing the advance of their enemies; but it is now time to consider the manner in which this parapet may be so arranged as to constitute a series of defensive and mutually defending works. If the antiquity of an invention be estimated by its position in the social history of the races of mankind, there can be no doubt that earthworks claim the priority over other forms of defense. In North America vestiges of circular earthen intrenchments, as well as of works of other forms, have been discovered, the antiquity of which is unknown; and, in more recent times, small parties of

the aboriginal inhabitants encountering greater numbers of a hostile tribe, have been known to excavate hollow spaces in the ground, and, throwing out the earth, to form around them circular intrenchments, in which they have defended themselves to the last. In Ireland the ancient inhabitants have left similar relics of their earthen defenses; in Great Britain there are numerous similar remains, the work of the Romans and of people long antecedent to the Romans; but the consideration of earthen works for the defense of extensive positions will be resumed further on, and such works will be considered here only in connection with the arrangements adopted by an army in the field for its own immediate security.

The art of constructing temporary works in the field for this purpose is called Field Fortification. This art is of very high antiquity; the Roman soldiers relied much upon such works, and executed them with wonderful rapidity, even in the presence of an enemy.

*Shelter Trenches.*—Of this art the simplest form is that in which troops are preserved intact until the moment of attack arrives. At first sight it would seem that this can best be effected by keeping them out of fire. The increase in the range of arms of all kinds has, however, become so great that it is no longer possible to keep troops out of fire, and yet in a sufficiently advanced position from which they shall be able to attack promptly; hence it has become an absolute necessity to provide shelter for them.

A very shallow trench with the earth thrown to the front will afford, to men lying in it, cover against artillery fire, and a good rest for their arms when they have occasion to deliver their own fire. Moreover, it presents no obstacle to the advance of supporting troops, and offers but little mark to the enemy. Such trenches (figs. 16, 17, 18, 19) are called shelter trenches, and may be made of any depth or form according to the time and means available. They are very difficult of capture by the front attack, when defended by trained troops with breech-loading rifled arms, and can be quickly developed into regular intrenchments. The ordinary forms of shelter trench in use in the British army are shown in figs. 17, 18, 19.

The Russians made use of shelter trenches with great effect in the defense of Sebastopol, and since that siege their employment has steadily developed.

In more recent times the greatest use of hasty intrenchments, though perhaps in the form rather of a line of intrenchments than of shelter trenches, was made by the Americans in the war of secession. Wherever they halted, no matter how short the time at their disposal, they threw up shelter. Each man worked for himself, and as if by instinct, and before fires were lit or provisions cooked, an intrenchment of some kind was formed. Probably the Americans had acquired this habit in their campaigns against the neighboring Indians; and no doubt the superiority of rifled small arms, then for the first time freely used, thoroughly imbued them with a sense of the value of the slightest protection. General Sherman's campaign in Atlanta, and the actions in the neighborhood of Richmond and Petersburg, furnish numerous instances. With reference to them General Barnard reports that a simple trench defended by two ranks of foot soldiers is an obstacle unsailable by direct attack. General Wright relates that, attacking a handful of infantry, in single rank, behind a parapet and trench, with two divisions in line, the number of his casualties exceeded the number of the enemy, and that if the intrenchment had been defended by two ranks of good troops, a whole army corps would not have taken it; and in summing up his relation, he says that a simple trench, defended by two ranks of foot soldiers, covered by abattis and other obstacles, placed



so that the new rifled arms have full scope, is absolutely impregnable except by surprise.

After the fall of Nicopolis in August, 1877, twenty-eight battalions of Turks, numbering about 10,000 men, collected at Plevna, and at once commenced to form shelter trenches; they were very deficient in artillery. Krudener attacked them four days after with 7,000 Russians and thirty guns, and was defeated with a loss of 2,800. Ten days later he again attacked with 30,000 men and 170 guns, but in the meantime the Turks had thrown up several redoubts, and had so extended their shelter trenches that their position was beginning to assume the condition of an intrenched camp; moreover, their strength had been swelled by reënforcements to 45,000 men. The Russians were again defeated with a loss of 8,000 men. Six weeks later, upon September 30th, Krudener, who had received thirty siege guns, having shelled the Turkish position for four days previously, attacked a third time with 50,000 Russians and Roumanians; but the Turks had in the interval received reënforcements of 10,000 men, and he was a third time repulsed with a loss of 15,000 men, though the Roumanians obtained possession of and held a large redoubt called Gravitza. It then became evident to the Russians that Plevna could not be taken by assault, and they commenced to besiege by rule. By October 24th they had completed the investment by the occupation of the Loftcha and Rahova roads, all of which were previously open to the Turks, and had brought into battery against it 300 guns, forty of which were siege guns. By December 10th they had collected 110,000 men and 500 guns around Plevna; and shortly after, Osman Pacha, having been repulsed with a loss of 6,800 men in an attempt to cut his way out, surrendered, and his whole force, amounting to 43,000 men with seventy guns, became prisoners of war.

An army intrenched or fortified in the field is in many respects of the same effect as a fortress; the intrenchments supply the lack of numbers, and enable it to cover a country, to stop the advance of a superior enemy, or, if he chooses to risk a battle, oblige him to engage at a disadvantage. Charles V. furnishes a notable instance of the first. Opposed to a combined force of twice his strength, he at once commenced to intrench his army. In a few hours he was in a position to resist attack; in ten days he was so secure that, upon receiving reënforcements a few days later, he was enabled to assume an offensive which led in four months to the termination of the campaign in his favor. "In a war of march and manœuvre," says Napoleon, "if you would avoid a battle with a superior army, it is necessary to intrench every night, and to occupy a good defensive position. The natural positions which are ordinarily met with are not sufficient to protect an army against superior numbers without recourse to art. Those who proscribe lines of circumvallation, and the assistance which the science of the engineer can afford, deprive themselves gratuitously of an auxiliary which is never injurious, always useful, and often indispensable."

Whenever Napoleon had time and occasion for strengthening his position by field-works, he acted upon the principles recommended in the above extract, as almost all his predecessors had done. In the wars which followed the Revolution of 1688, in those of Queen Anne's reign, and during the Seven Years' War, we find the commanders of each period, William III., the duke of Marlborough, Marshal Villars, Marshal Saxe, Frederick II., and Marshal Daun, practically exemplifying their conviction of the great utility of field-works. Seven redoubts thrown up over night saved Peter the

Great at Pultowa, and enabled him to gain a decisive victory over his formidable antagonist; and at Borodino, three redoubts and eight *flèches* thrown up hastily by the Russians caused the French great loss, and rendered the victory, which they gained by incredible efforts of gallantry, fatally costly; and it is not improbable that if the main redoubt had been closed at its gorge the French would have failed to take it. In 1761 Frederick the Great, having only 55,000 men to oppose to the united Austrian and Russian forces of 130,000 men, intrenched himself in the strong position of Bunzelwitz, in Upper Silesia, not far from Schweidnitz, which he held until the united armies were forced to retire for want of supplies. It has been argued by some that intrenchments and field-works have oftener been carried than successfully defended, and that hence incommensurate importance has been attached to them. But it should be remembered that victory in such circumstances has been purchased at an expense which has often rendered it in effect equivalent to defeat, and that a practice which the greatest commanders of ancient and modern times have approved and followed cannot be of doubtful utility. At Austerlitz, where the contending armies were nearly equal, Napoleon was preparing to superintend the construction of intrenchments when he found himself called upon to receive battle; and in Portugal, the duke of Wellington showed to what account the art of the engineer might be turned for influencing, not merely the fortune of a campaign, but the fate of a cause. The lines of Torres Vedras, which the powerful French army under Masséna was unable to pass, and from which the wave of war was rolled back broken into Spain, were perhaps the most remarkable works of the kind ever constructed.

"Lisbon," says Sir John Jones, "being situated at the extremity of a peninsula formed by the sea and the Tagus, it is plain that if an army be posted across the peninsula, no enemy can penetrate into the city without a direct attack on the army so posted. It was on this principle that the lines covering Lisbon were planned by Lord Wellington. Nature drew the rude outline of a strong defensive position, and art rendered it perfect. A tract of country thirty miles in extent from the mouth of the Zizandra on the ocean to Alhandra on the Tagus, was modeled into a field of battle; mountains were scarped perpendicularly, rivers dammed and inundations formed; all roads favorable to the enemy were destroyed, and others made to facilitate the communications of the defenders; formidable works were erected to strengthen and support the weak parts, while numerous cannon, placed on inaccessible points, commanded the approaches and gave an equality of defense to the whole position." These lines were not continuous and connected works; they consisted of independent forts, redoubts, *flèches*, redans, batteries, so placed as to command and enfilade every approach, and to support each other by a cross and flanking fire. The first line occupied a front of twenty-nine miles between the sea and the Tagus, and by means of telegraphs intelligence could be conveyed from one extremity to the other in a few minutes; while the troops, disposed in masses in the rear of the works, were ready to move upon any point of attack by interior communications shorter than any by which the enemy could advance. "The aim and scope of these works," says Colonel Napier, "was to bar the passes and to strengthen the fighting positions between them, without impeding the movements of the army. These objects were attained; and the loss of the first line would not have been injurious, save in reputation, because the retreat was secure upon the second and stronger line, and the guns of the first were all of inferior caliber mounted on common truck carriages, and consequently, immov-



able and useless to the enemy." The two lines covered an extent of fifty miles, on which were erected one hundred and fifty forts, mounting in all about six hundred pieces of artillery.

Before this formidable position, defended by a double line of works, and by an army massed and ready to move upon any point by interior communications, the French remained five months, wasting their numbers and resources; until at length, finding it utterly impracticable to force any part of even the first line, they were obliged to retire from Portugal, closely followed and harassed by the army which they had previously driven out of Spain. Yet perfect as were the lines of Torres Vedras, and though one of the ablest of the French generals and a veteran French army were foiled before them, it is not meant to infer that the system of separate field-works is a model to be followed on all occasions; for, though the old method of covering a considerable front by a continued line of regular bastions and curtains has been generally condemned by modern engineers, there may be situations where the application of continued lines may be judiciously made. There is no fixed rule; the nature of the ground and of the position to be defended must determine the proper description of works.

Field-works are either open at the gorge, or inclosed all round. They are of the following kinds:—

Redans, or simple heads, double redans, or queues d'hironde, bastioned heads, redoubts, star forts, bastioned forts, demi-bastioned forts, lines of redans, lines of tenailles, lines à crémaillère, lines of bastions, lines broken or with intervals.

The first class are of the simplest kind of field-works, and serve as cover in front of avenues, bridges, causeways and the like; being open at the gorge, they are only used when their extremities rest on rivers, or on obstacles which prevent their being turned, or when within the full sweeping fire of works in their rear. To increase the strength of a "Redan" its faces are sometimes broken into a kind of flank, as in fig. 20. In the "Double Redan," or "queue d'hironde," fig. 21, the reëntering faces defend each other. "Bastioned Heads" (fig. 22) are also employed in similar circumstances.

"Redoubts" (fig. 23) are closed works of square or polygonal figure. In square redoubts provision should be made for defending the ground before the angles, which, however, are sometimes rounded or cut *en crémaillère*, so that a direct fire may be delivered from them.

Half-closed Redoubts, that is, redoubts in which the gorges are closed by thin parapets or timber stockades, may more fitly be classed here. They are employed when it is intended that their interior shall be open to artillery fire, so that an enemy having captured may not be able either to retain them or to convert them to his own uses.

Forts are works the parapets of which defend the ditches, and this distinguishes them from redoubts, the parapets of which do not.

"Star Forts" are designed to deliver a cross fire from the adjacent sides; but according to Jomini, "they are the very worst description of fortification; they cannot have flanks, and the reëntering angles take so much from the interior space that it is impossible to place troops and artillery in them sufficient for their defense," an opinion confirmed by the practice of Sir Richard Fletcher and Sir John Jones in the construction of the lines of Torres Vedras, where the trace of the redoubts was varied to suit the conformation of the ground.

In "Bastioned Forts," the flanking defense afforded by the parapets to the ditches is nearly perfect. As

bastioned forts are only constructed in special cases of importance, no labor or expense should be spared in their formation. The bastioned face may be applied to any polygon provided that its angles are not less than  $90^\circ$ . When the angles are less than  $90^\circ$  the salients of the bastions are too acute.

"Demi-bastioned Forts" inclose a greater interior space than Bastioned Forts, but a portion of their ditches is only defended by an oblique fire from the parapets of their faces.

The parapets of all these works should be of sufficient thickness to resist the fire of the heaviest guns that can be brought against them. In some cases it will be necessary that the parapets should be strong enough to resist the fire of light field-guns, while in others it will be sufficient if they serve as a cover to the men within them against musketry. This latter cover is that which, when time for more does not avail, is thrown up at the close of a march, after taking up a position, and which, if the army does not move next day, may be strengthened in parts, according to circumstances.

Continued Lines, or connected works, are resorted to in order to inclose the front of a position, or to connect important works or forts. The most simple trace is that of redans joined together by curtains (fig. 27); the ditches of these curtains can only be defended by an oblique fire from the faces of the redans, but this defect may be remedied by breaking the curtains so as to form nearly right angles with the faces of the redans, in which case they are called "Lines of Tenailles" (fig. 28).

"Lines en Crémaillère" have long faces, with flanks perpendicular to them, in order to defend their ditches (fig. 29). When the faces can be directed toward ground upon which it is impracticable to establish enfilading batteries, this trace is good.

Bastioned Lines (fig. 30) form the strongest trace which can be given to continued lines, when the ground will admit of its adoption. A perfectly regular trace can only be applied to level ground. The ditches in field-works are often sloped *en rampe* toward the adjoining flanks, in order that the "deblai," or quantity of earth excavated, may not exceed the "remblai," or quantity in the mass of the rampart or parapet, a condition which might otherwise occur in field-works, where there is seldom any rampart, and only cover sufficient for the defenders.

Fig. 31 shows the general trace of "Lines with interval." The salient works should never be beyond the range of musketry from the reëntering works, and the angles of defense between the two lines should be as nearly right angles as possible.

"Têtes-de-pont," or Bridge-heads, are works, open at the gorge, whose flanks rest upon a river, designed to cover one or more bridges. The best situation for these works is the reëntering sinuosity of a river. As Têtes-de-pont (fig. 32) are usually constructed for the purpose of enabling a retiring army to cross a river in order, and to check an enemy pressing upon it, their trace and profile should be such as to secure this double advantage to the greatest extent possible. In Sir Howard Douglas' able work on the *Construction of Military Bridges* will be found much valuable information upon this important subject.

The obstacles which are usually added to field-works, in order to render the approaches more difficult to the enemy, such as shelter trenches, entanglements, palisades, barriers, abattis, trous-de-loup, chevaux de-frise, harrows, and crows' feet, have been already described.

*Defense of Open Towns and Villages* (fig. 33).—To admit of a town being advantageously intrenched it is necessary that it should not be commanded within



range of field-guns, that its houses should not be of a construction easily set on fire, such as of wood with thatched roofs, and that its extent should not be out of proportion to the means and time at the disposal of the defenders. The last consideration is of much importance and should be well weighed, as this kind of defense is prodigal of men. It is however rapidly organized; and, as the number and the nature of the troops allotted to it are effectually concealed, it is susceptible of being prolonged obstinately. When time presses the first step is to occupy the outer inclosures and to bar the principal thoroughfares upon the enemy's side, to construct abattis and shelter trenches, to loophole the buildings flanking the barriers, and then to form a strong "shooting line" behind the outer inclosures, clearing enough of the ground in rear to receive the supports and reserves, and to enable them to act efficiently either in assisting to expel the enemy or in covering the retreat. The approaches to the "shooting line" should be cleared for a distance of at least 300 yards, by leveling houses, hedges, shrubberies, filling ditches, and clearing away whatever may favor the assailants. Wood should be cut down about two feet six inches above the ground, and with wire or other means formed into entanglement; hedges may often be so formed into most effective entanglements. The squares and open places should be occupied by the main reserves; the main approaches should be subjected to artillery fire; and distinct communications should be formed for the retreat of the defenders of the "shooting line." The inclosure around the town should be completed, and for this purpose some houses should be removed, others should be loopholed, streets should be barricaded, secure places found for the magazines, and cover provided for the main supports and reserves, and wide and easy communications laterally and to the rear should be made. Streets leading out of town should be barricaded. The barricades should be sufficient to resist field artillery, and high enough not to be easily surmounted; and they ought to be flanked by loopholing the neighboring houses. When time presses, carts filled with dung with the wheels removed, sand-bags, bales of wool or cotton, and furniture taken from the neighboring houses can be used as barricades. A church, a manufactory, a town-hall, a market, or any large substantial building should be converted into a keep, by blocking up useless entrances, loopholing its walls, and surrounding it by a ditch or abattis. Loopholes are slits or notches cut in walls with such tools as may be at hand. They are usually about three inches wide and twelve inches long externally, and are splayed internally so as to allow variation in the direction of the fire. Loopholes are cut vertically or horizontally as the case requires, and are much used as temporary means of supplementing the cover afforded by the parapets of temporary and permanent works; they are then formed of materials at hand, such as sand-bags, logs of wood, and brushwood. Sand-bag loopholes are the best, as the whole loophole is not necessarily destroyed by the blow of a projectile, and they are easily moved from place to place; two sand-bags are placed side by side with an interval between them, and a third covers this interval. Logs of wood are disposed similarly; brushwood or board loopholes are embedded in the parapets. If a town is situated near a stream or river, by which part of it may be covered by inundations, the resources this affords should never be neglected.

Villages are intrenched on similar principles, and being generally surrounded by gardens with live hedges, the latter may be made use of in the lines of defense. If there should only be sufficient troops to defend part of a village or town, a part of it only should be in-

trenched, and should be separated from the rest by means of carts and barricades. If there are very few houses, it may be necessary to confine the defense to the church or churchyard. Villages are often in one long street; then only the rear portion is intrenched, clearing in front of this portion a space sufficient for the effective action of musketry.

*The Destruction of Bridges.*—Nothing is of greater consequence to a retreating army than to destroy the bridges in its rear, in order to retard the advance of the enemy. Its existence may depend upon the success with which this operation is performed. To destroy a stone bridge with gunpowder a trench in the form of a cross is made in the crown of the arch, the branches of which are about ten feet in length, and sunk to the top of the arch-stones. For an arch three feet thick, 160 pounds of powder are placed in each trench; strong planks are then laid over the powder, and covered with rubbish. The fire is communicated by means of powder-hose or Bickford's fuse. Stone bridges are destroyed also by simply cutting a trench about eighteen inches deep across the crown of the arch, and placing in it 345 pounds of powder covered in the manner just described. This quantity has been found sufficient to destroy semicircular arches of twenty-five feet span, and of three feet in thickness at the key. Wooden bridges may be destroyed in various ways; they may be pulled to pieces, burned, or blown up. When there is time to take them to pieces, they are unspiked, and the timbers so separated that they may be speedily removed. The best method of burning such bridges is to tar them, and then to cover and surround them with fascines or tarred brushwood. Wooden bridges may be blown up by large charges of powder suspended under the superstructure, and fired in the manner above described. But these and other hasty demolitions may be more quickly and more certainly effected by the use of compressed gun-cotton, which is, weight for weight, four times as strong as gunpowder, and requires no tamping. Compressed gun-cotton is stored damp, and in this state it is perfectly safe for transport and handling, as it can only be detonated by the agency of a small quantity of dry gun-cotton, called a primer, and a detonator. The detonator is fired in the ordinary way or by electricity. Compressed gun-cotton is made in many convenient forms and sizes, such as one ounce and one-half ounce discs, one pound or two pound slabs, pellets, and grains. Generally it should be evenly distributed over the surface of stone bridges—if heaped, it forces an opening clean through. Supports of timber bridges may be destroyed by a girdle of half-ounce discs tied round them; or, if time avails, by charges placed in auger holes bored in them; one-half ounce of gun-cotton is sufficient for each square inch of the sectional area of the support. Iron bridges are destroyed by attacking the bottoms of the piers, or, in the case of girder bridges, the junction of two girders; two pounds of compressed gun-cotton per foot lineal laid against an eighteen inch brick wall will destroy it.

A ford is rendered impassable by throwing large stones into it, by sinking boards with spikes standing upright in them, or by placing crows' feet or harrows in it. A low rubble wall may be formed across it, so as not to be perceptible above the water; strong stakes may be driven into the bottom, and trees fastened to them; wagons loaded with stones, with the wheels removed, may also be employed; and a number of other things which may often be found at hand will answer the purpose equally well. Rendering a ford impassable is only second in importance to the destruction of a bridge, when the enemy, whose progress it is desired to retard, either has no pontoon-train, or has outstripped it by the



rapidity of his advance. By such expedients to retard the pursuit much valuable time may be gained by the retreating army.

The essential characteristic of all intrenchments which are formed of earth is that the musketry fire, on which the defense must mainly depend, being discharged over the crest of the parapet, the line of fire will be nearly in the plane of the superior slope of the parapet, and perpendicular to the line of its crest; and hence opposite a salient angle, as in the redan (fig. 34), there will be a large space of ground in this case extending over  $180^\circ - 60^\circ = 120^\circ$ , undefended by the fire of the work itself; this space is called a "dead angle." Opposite reëntering angles, on the other hand, the defect is of a different kind, as the plane of the superior slope or plane of fire passing high above the foot of the escarp necessarily leaves it unseen and unprotected, notwithstanding that the two lines theoretically flank each other. The object, therefore, in arranging field-works for mutual defense should be so to regulate their reliefs that the lines of defense should terminate at such distance from the ground as to give effective defense to the parts of the works intended to be flanked. The redan may be considered the most simple form of *defensive* work, though a straight parapet terminating by short returns at each flank, in the form either of epaulements or of regular parapets, may occasionally be combined with defensive works. The redan is open in the rear, and the line joining B and C is called the gorge.

The "Lunette" is a redan to which flanks or lateral wings have been added; in form, therefore, it resembles a bastion. In fig. 31 Lunettes are shown so arranged that the faces of those in rear may flank the faces of those in front; but with respect to the distribution and arrangement of the works destined to form Lines of intrenchment, more will be said hereafter.

In every case it is desirable to take advantage of peculiarities in the features of the country, and to modify them into such obstacles as shall relieve the defenders from apprehension of danger, and leave them at liberty to direct their attention more exclusively to the weaker points of their position; but in no case should even apparently inaccessible points be left unwatched, as an enterprising and skillful adversary will at times surmount difficulties which had appeared insurmountable. As naturally defended points in a position can only be looked upon as exceptional advantages, it is evident that works left open at their gorges would be liable to surprise, and would therefore prove but imperfect instruments of defense. On this account it has been not infrequently prescribed that such works should be left unclosed when within range of musketry fire from the defenses behind them; but it is better to lay down the fixed principle that in all cases they should be closed at the gorge, as the power of driving an enemy out of the interior of such a work is of little value, for his object would be not to remain in its *interior*, but to turn its parapet to his own uses. The manner in which they are generally closed is shown in fig. 35, which is a lunette secured at its gorge by a loopholed stockade, an obstacle effective against an enemy, and, at the same time, easy of destruction, should he succeed in temporarily obtaining possession of the work. Any of the obstacles previously described, such as abattis, etc., may be used for the same purpose, but they have the disadvantage of not covering the defenders of the work from the enemy's fire. An engineer in deciding between open works, such as have been described, inclosed works such as will now be described, ought to take into consideration the circumstances of ground not only as affecting the security of the work itself, but as affecting the ease or difficulty with which support can at any

moment be afforded to its garrison. Open works are not fitted for any position where they are likely to be left to their own resources, even for a short time, as small bodies of men cannot be expected to stand firm against a vigorous attack from a superior force, unless satisfied that support is at hand. Closed works, therefore, in which the parapet is continuous on all sides, can alone be relied upon under such circumstances; and the nature of the obstructions adopted in their construction should be such as to afford the garrison a reasonable confidence that by a vigorous defense they may be able to hold the enemy at bay; for no general should expect to find in soldiers, as a body, that heroism which leads to self-sacrifice without hope. The easy capture of the redoubts at Balaclava, garrisoned by the Turks, is an illustration of this principle; for though it is possible that they might have been longer maintained by French or British soldiers, it would have been unreasonable to expect that their defenders should remain firm until overpowered and cut down by their assailants, which must have been the result had not a supporting force been at hand to relieve them. The rules may therefore be laid down, that in all detached works the mode and time of relief should be palpable to the garrison; that the nature of the constructions should inspire the garrison with confidence in its power of resistance for a reasonable time; and, above all, that the garrisons of such works should be composed of the best soldiers.

**PERMANENT FORTIFICATION.**—If, as has been stated, simple lines or works of fortification have been adopted even by the rudest tribes of wandering savages, for their temporary defense or security, the more massive and artistic works of permanent defense would seem to imply a certain amount of civilization. As an art, indeed, Fortification is almost co-existent with society. When men first assembled together for mutual protection, and placed their habitations in one spot, the law of necessity, springing in this case from the principle of self-defense, rendered it indispensable for them to adopt means for securing their families and their property against the sudden inroads of enemies. In the early ages, men were sufficiently protected by a wall, from behind which they could with safety discharge darts, arrows, and other missiles against an assailant. But when, in the progress of improvement, new and more powerful means of attack were discovered, it became necessary to increase, in a corresponding degree, the power of resistance; and so it came to pass that the feeble defensive structures of primitive times were superseded by solid ramparts, flanked and commanded by elevated towers; and, as the power of attacking fortresses or places of strength became augmented by successive devices and inventions, so the means of resistance became proportionally increased, until the art of Fortification arrived at a state of comparative perfection, in which for many ages it remained nearly stationary.

The various improvements which were from time to time made, in strengthening the walls and in adding to the defenses of ancient cities, are recorded in history, and need not be detailed in this place. The first walls of which we read were of brick. Among the ancient Greeks, brick and rubble stones intermixed were used, as we find from the description of the wall which connected Mount Hymettus with the city of Athens; but, surrounding several cities were works of Cyclopean character, built of huge stones, without mortar, placed with their longer axis transversely to the line of wall, and arranged with great care and skill. The walls of Babylon and Nineveh indicate a prodigious advancement in the art of Fortification, and are justly accounted among the wonders of the ancient world. Those of the



# FORTIFICATIONS.



FIG. 16.—Shelter Trench,—constructed in 25 min. to ½ hour.

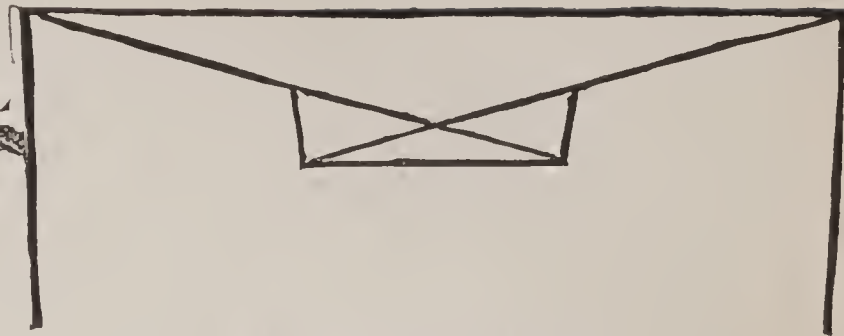


FIG. 22.—Bastioned Heads.



FIG. 17.—Shelter Trench.



FIG. 20.—Redan.



FIG. 21.—Double Redan.

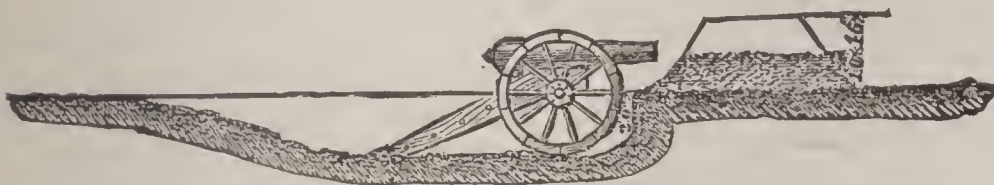


FIG. 18.—Shelter Trench.

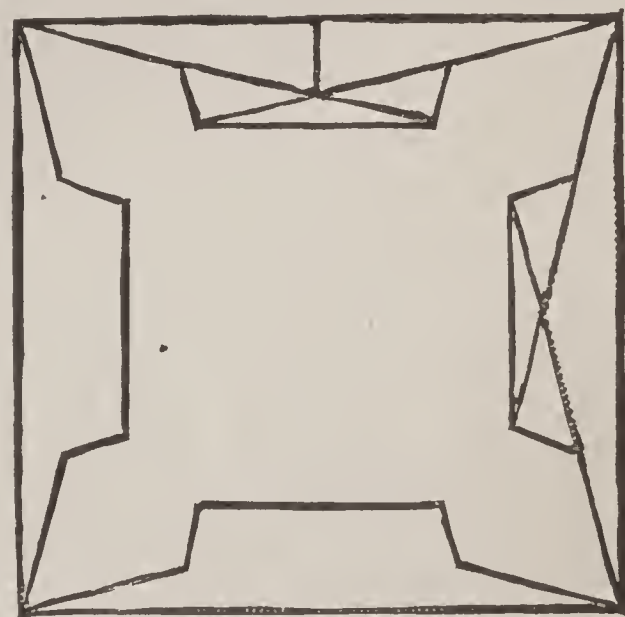
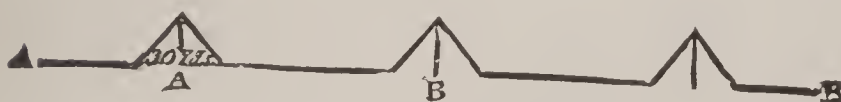


FIG. 25.—Bastioned Forts.



FIG. 19.—Shelter Trench.



AB varies from 180 to 400 yards.

FIG. 27.—Lines of Redans.



AB varies from 300 to 600 yards.

FIG. 28.—Lines of Tenailles.

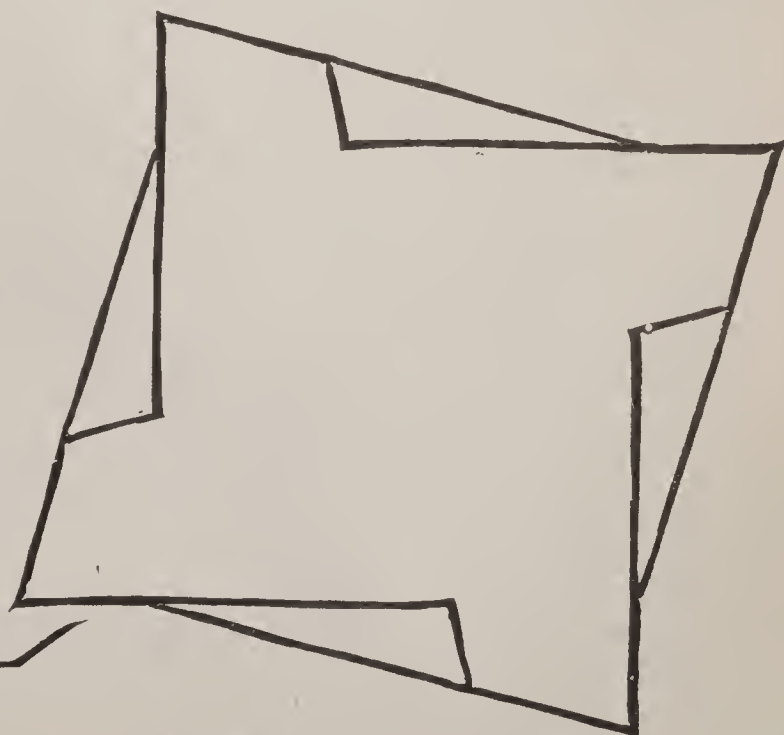


FIG. 26.—Demi-bastioned Forts.



# FORTIFICATIONS.



FIG. 29.—Lines en Crémaillere.



FIG. 30.—Lines of Bastions.

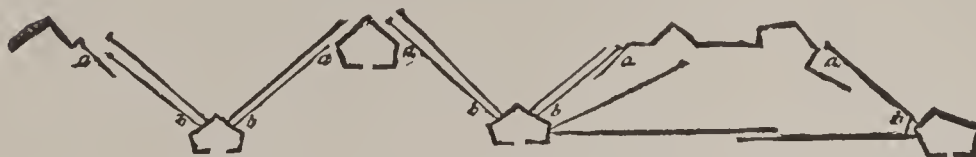


FIG. 31.—Lines broken or with intervals.



FIG. 32.—Tete-de-pont.

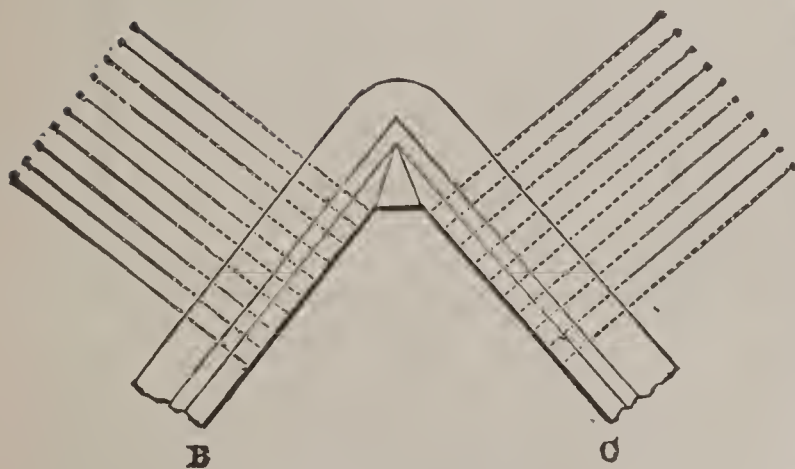


FIG. 34.—Redan.

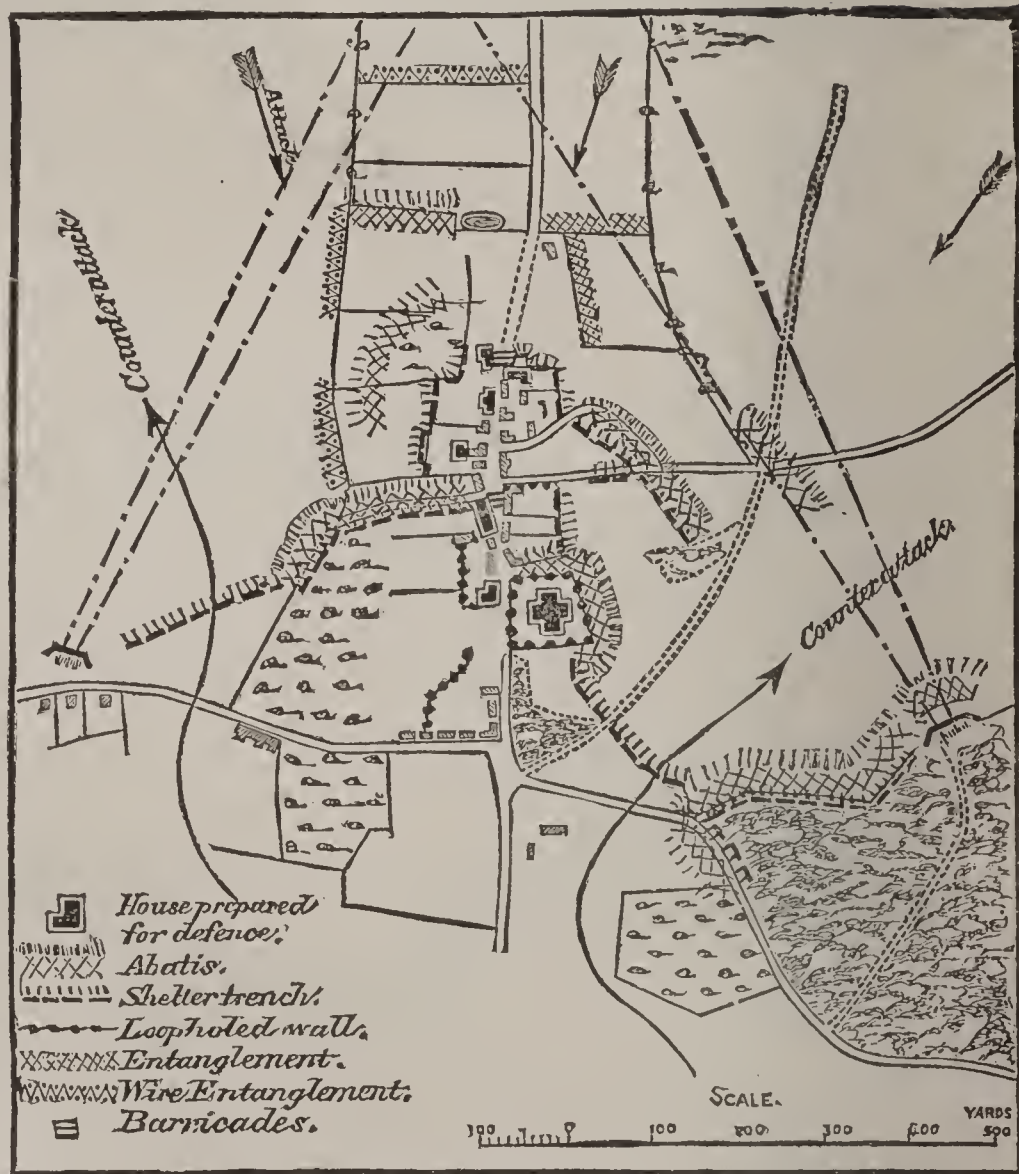


FIG. 33.—Illustrating Defense of Towns or Villages.

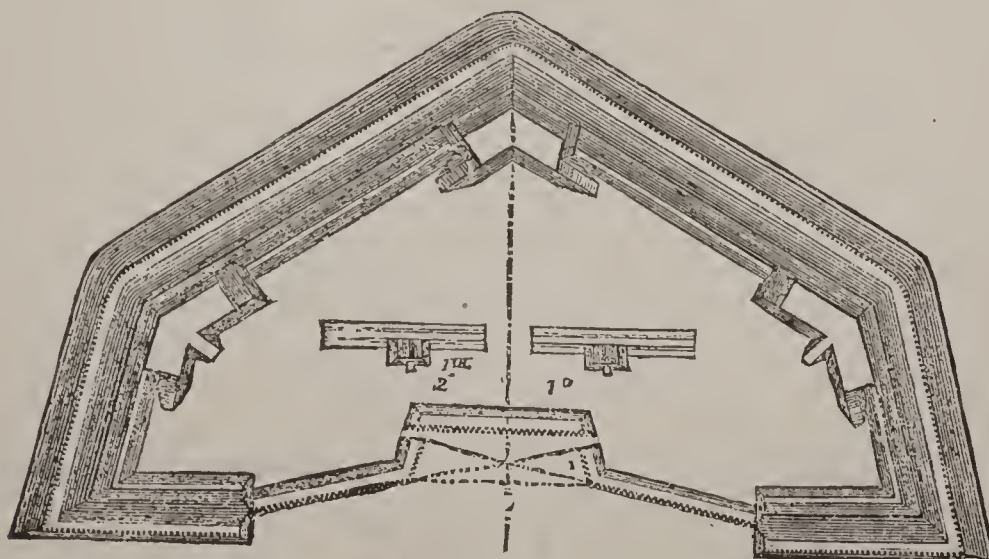


FIG. 35.—Lunette closed at the Gorge.



former city, ascribed by some to Belus, and by others to Semiramis, were thirty-two feet in thickness, and one hundred feet in height, surmounted at intervals by towers ten feet higher, and cemented by means of bitumen or asphaltum; they encompassed a vast area, and presented a solid defense, which no means of attack known in ancient times were sufficient to overcome or beat down. The walls of Jerusalem, though of smaller dimensions, appear to have been little inferior in strength and solidity to those of Babylon; for, in the siege of that capital by Vespasian, all the Roman battering-rams and other engines, though used with the utmost vigor through a whole night, only succeeded in disengaging four stones in the masonry of the tower of Antonia. But after Fortification had arrived at the state in which we find it in the works of these and other cities, it remained stationary for ages, and perhaps even retrograded somewhat, until the discovery of gunpowder, the invention of artillery, and the application of both to military purposes, effected an entire revolution in the principles of attack and defense. Then the towers, which had formed secure flanking defenses against assailants armed only with arrows and darts, no longer afforded protection against projectiles discharged from cannon; and even those battlements which had defied the catapult and the battering-ram speedily fell before the new force with which they were assailed, burying their defenders in their ruins.

The ancient system of Fortification being thus found of little avail against the new method of attack which came into general use toward the close of the fifteenth century, it became indispensably necessary to adopt improved methods of defense. The plan of fortifying with bastions is believed to have originated with the Italians early in the fifteenth century; though Papacino D'Antonio, professor of artillery and engineering, of Turin, states in *Architettura Militare* (1759), that several small bastions had been constructed in the preceding century, and that the ruin of a large bastion which had formed part of the fortifications of Turin, built for Duke Louis of Savoy, still existed in the royal gardens at that time. The bastions on the enceinte of Verona, built by the Italian engineer Micheli, in the year 1523, are generally supposed to be the oldest extant; and the next, probably, are those of the citadel of Antwerp, which were constructed for the emperor Charles V., in 1545, by the Italian engineer Paciotto D'Urbino. These bastions are small, with narrow gorges, and short flanks and faces, and are placed at great distances from one another, it being the invariable practice, at the time when they were built, and for a considerable time afterward, to attack the curtains, and not the faces of the bastions.

Errard, of Bois-le-duc, was the first in France who laid down rules respecting the best method of fortifying a place, so as to cover its flank. He was one of the principal officers of the engineers in ordinary to the king, a corps formed by Sully, who was grand master, or master general, of artillery in the reign of Henry IV., out of the best instructed and most experienced military men. This corps is now the Corps de Génie, and to this day maintains its scientific character. At the command of the minister, Errard wrote a book on the subject, which was published in 1594, and in which the details of his method are explained. As a writer on fortification, he was preceded in France by Beril de la Treille, who published his work on fortifying towns and castles, in 1557. Errard fortified inward; and in the square, pentagon, hexagon, heptagon, and octagon he made the flank perpendicular to the face of the bastion; but in the enneagon, and in polygons of a greater number of sides, he made it perpendicular to the curtain. In his method,

however, the gorges are too small, the embrasures are too oblique, and the ditch is almost defenseless. This engineer constructed part of the enceinte of the citadel of Douvens, the citadel of Amiens, and some works at Montreuil and Calais.

Antoine de Ville, who succeeded Errard, published a treatise, dated 1629, in which he completed much that his predecessor had only sketched, and rectified various defects in the method of the latter. He was employed under Louis XIII., and constructed new enceintes for Montreuil and Calais. His method of fortifying has been denominated by some the French Method, and by others the Compound System (*Système à trait composé*), because it united the Italian and Spanish methods, from the latter of which it differs only in having no second flanks and fichant lines of defense, and in not confining the flanked or salient angle of the bastion to ninety degrees. The leading maxims of De Ville were to place the flanks perpendicularly to the curtain, to make them equal to the demigorges, or a sixth part of the side of the interior polygon, and, in the hexagon and all higher polygons, to confine the flanked angle to ninety degrees. But this method is liable to nearly the same objections as that of Errard, as the embrasures are too oblique, especially in the polygons, and the ditch is ill defended.

In 1645, sixteen years after the publication of De Ville's, appeared the treatise of the Comte de Pagan, which contained the development of a system that, in a short time, entirely superseded those of his predecessors. It was the Comte de Pagan who first disengaged the science of Fortification from a number of suppositions which custom has consecrated, and which, resting more on abstract mathematical reasoning than on practical experience, had hitherto retarded the progress of the art. This engineer served at twenty-five sieges with great reputation; but having become blind at the age of thirty-eight, he was obliged to retire from the service, in which he had already obtained the rank (then second only to that of marshal of France) of mareschal-de-camp, and he died six years after completing the treatise above mentioned. He had from his earliest years devoted himself to the study of mathematics and fortification, and he published several works on astronomy besides his celebrated work on Fortification. Pagan made the flank perpendicular to the line of defense, in order as much as possible to cover the face of the opposite bastion; and he devised a method of building casemates peculiar to himself. Vauban borrowed from Pagan the length of his perpendicular, and Allain Manesson Mallet, whose construction has found much favor, proceeded upon the principles Pagan had laid down.

The Mareschal de Vauban was born in 1633; and at the time of the Comte de Pagan's death, he had already acquired reputation at several sieges. Vauban followed up the principles suggested by Pagan, and employed them extensively, with consummate skill and judgment. He constructed thirty-three new fortresses, repaired and improved one hundred, and conducted about fifty sieges. His extensive works, especially the treatise *De l'Attaque et de la Défense des Places*, published in 1737, speak for themselves. From these works have been compiled the systems which, in the military schools, are denominated Vauban's first, second and third systems of fortification. Had the genius of Vauban been applied to the discovery of a method for securing a permanent superiority to the defense of fortified places, posterity would have been greatly indebted to him, and even humanity would have had cause to rejoice in such a triumph of military art. But, being engaged in the service of the most ambitious monarch of modern times, Louis XIV., he applied his great talents to forward his master's views, and perfected that irresistible



system of attack which has ever since been so successfully followed. Before his time the superiority was on the side of the defense; but he so completely reversed the case that the success of an attack, conducted scientifically and with adequate means, has been until the present time a matter of certainty. Vauban was no ordinary man in any sense. As the inventor of parallels in sieges, and of ricochet fire, he stands in the first rank of military engineers; and as he conducted fifty-three sieges, and took part in one hundred and forty battles and skirmishes, it must be admitted that in respect of experience he stands in no inferior position. At fifty-five years of age he attained the highest honor of the French army, being created marshal of France; yet amidst his stirring and successful military life he never ceased to turn to account the geometrical knowledge for which he was distinguished when a youth, and which had obtained for him the early notice of the Prince de Condé. His mind was never idle, and was constantly directed to projects of public utility, civil as well as military; and he left behind him records of such labors in twelve folio manuscript volumes, entitled *Mes Oisivetés*, a wonderful monument of his ability and industry.

M. Minno, Baron de Coehorn, first a general of artillery, then a lieutenant-general of infantry, and ultimately director-general of all the fortified places belonging to the United Provinces of Holland, was the contemporary and rival of Vauban. This able engineer, convinced that, however expensively the rampart of a town may be constructed, it cannot long resist the shock of heavy ordnance, invented three different systems by which such obstacles are thrown in the way of a besieging force that, although the place be not thereby rendered impregnable, it can only be reached with great difficulty and hazard. But these systems, without modification, are only applicable to low and swampy situations, such as are to be found in Holland, and are therefore not available in localities of a different description. Nevertheless, Bergen-op-Zoom, Mannheim, and other places fortified by this engineer, particularly the two named, have very great merit, inasmuch as it is impossible for a besieger to penetrate into any of the works without being exposed, on all sides, to the fire of the besieged, who are under cover, and from whose artillery and musketry fire it is scarcely possible for an assailant to shelter himself. In fact, Coehorn was a great master, and combined with the bastioned trace many of the means of defense springing from another source. He published his first work on Fortification before he had acquired much experience; and in fortifying Bergen-op-Zoom, which is allowed to be his masterpiece, he did not reproduce, except in fragmentary details, any of his published systems.

Since Vauban's time several improvements have been suggested, particularly by Cormontaigne, who entered the corps of French engineers in 1716, nine years after Vauban's death, and died in 1750. The three methods enunciated by Belidor are all applicable to an octagon of 200 toises. Scheiter distinguished his systems as great, mean, and little, in imitation of Pagan, requiring the exterior sides of the polygon to be 200, 180, and 160 toises respectively. He adopted from Castriotto detached bastions, and made use of a continuous *fausse-braye*. Fritach, a Pole, proposed two methods, which he exemplified on different polygons. Dogen, a Dutchman, after enumerating, in a large volume on Fortification, various modes employed by different writers for determining the salient angle, selected three as most worthy of approval, and proposed as many methods of construction, one of which is borrowed from Fritach, the Pole. Pietro Sardi, an Italian, sug-

gested a peculiar method of construction on a hexagon. The Sieur de Fontaine founded the flanked or salient angle of the bastion by adding  $15^\circ$  to half the angle of the figure, from the square up to the dodecagon, in which last it becomes  $90^\circ$ , and at this he continued it in all the higher polygons. He also constructed outward, and, in every regular figure, made the curtain equal to seventy-two toises, the face of the bastion to forty-eight, and the flank, which he placed perpendicularly to the curtain, to eighteen toises, or a fourth part of the curtain. Ozanam and Müller delivered each four methods of construction, the particulars of which will be found in their respective works.

**FORT DODGE**, the county seat of Webster county, Iowa, is situated on the Des Moines river, 135 miles east of Sioux City, at the junction of five railroads. Coal is mined in the vicinity and large amounts of grain are shipped. The city contains a court-house, seven churches, two national banks, two foundries, nine schools, and a public library. It is lighted by gas and electricity, possesses fire and police departments, and water-works on the Holly system. Population (1890) 4,850.

**FORT HOWARD**, a town of Brown county, Wisconsin, is situated on the left bank of Fox river, sixty-five miles northeast of Fond du Lac. It is a busy place of 4,780 inhabitants, and has considerable industrial interests, including foundries, saw mills, boiler and machine factories, and sash and blind factories. Lumber is the principal article of export. The thirty factories have an invested capital of \$600,000, and an annual product of \$700,000. There are five schools and eight churches, the city is lighted by electricity, and has a water and sewer system, and an efficient volunteer fire department. The assessed valuation in 1890 was \$1,010,000 and the tax levy averages \$2.25 per \$100.

**FORT MADISON**, the county seat of Lee county, Iowa, is situated on the Mississippi river, twenty-four miles above Keokuk, at the junction of two important railroads. It is the site of the State prison, and contains a court-house and other public buildings, ten churches, a high school and other schools, national and savings banks, lumber mills, foundries, and manufacturing of boots and shoes, chairs, furniture and agricultural implements. Population (1890) 7,906.

**FORTROSE**, a royal and parliamentary burgh of Scotland, county of Ross, is situated on the north side of the Moray Firth, nearly opposite Fort George, from which it is two and one-half miles distant, and with which it has regular ferry communication.

**FORT SCOTT**, an important railroad and telegraph town of Bourbon county, Kansas, containing 11,946 inhabitants, Its growth has been phenomenally rapid, especially since the construction of the Kansas City, Fort Scott and Gulf railroad, which has placed it in communication with the great distributing centers of the Mississippi Valley and the Southwest. The town takes its name from Gen. Winfield Scott, at the time of its foundation commander-in-chief of the United States army. Fort Scott contains a federal court-house and post-office, built at a cost of \$112,000; eight public schools, valued at \$110,000; and a Normal college, \$60,000. There are eighteen churches, water-works, good sewers, horse-power and electric street railroads, a volunteer fire department of eighty men, and a police department. The city receipts for the fiscal year ending April 1, 1890, were \$41,157, and the expenditures \$40,692; the assessed valuation was \$2,369,000.



**FORT SMITH**, a town of Sebastian county, Arkansas, is situated on the south bank of the Arkansas river, 170 miles west of Little Rock. It is an important railroad and shipping town with a population of 11,311. and is the seat of a United States District Court, having criminal jurisdiction of the Indian Territory. The town contains two national banks and one other bank, several newspaper offices, twelve churches, flouring mills, breweries, tanneries, planing mills, agricultural implement factories, etc.

**FORTUNA**, the Latin goddess of Fortune, answering to the Greek Tyche. This deity was of far more importance in Italy than among the Greeks.

**FORTUNATE ISLANDS**. See **CANARY ISLANDS**.

**FORTUNATUS**, the legendary hero of one of the most popular European chap-books.

**FORTUNATUS**, **VENANTIUS HONORIUS CLEMENTIANUS**, bishop of Poitiers, and the chief Latin poet of his time, was born near Ceneda in Treviso, in 530. He was elected bishop in 599, and died about 609.

**FORT WAYNE**, the county seat of Allen county, Indiana, situated 751 miles west of New York, and 102 northeast of Indianapolis, at the junction of the St. Joseph and the St. Mary, which form what is known as the Maumee river. In the early part of the eighteenth century the French established a trading post on the site of the present city, which took its name, however, from a frontier fort, erected in 1794 by General Wayne. The inhabitants, in 1840, numbered 1,200; in 1860, 10,319; in 1880, 25,760; in 1890 they were enumerated at 35,393. The first city charter was granted in 1839; Nine railway lines pass through the city. There are four banks, five daily newspapers, ten miles of street-railway, a public and a Catholic library, and churches of all denominations. The public schools occupy twelve buildings. There are several institutions for higher education, notably Methodist and Lutheran. Forty miles of water main supply water for domestic purposes and fire protection. The new government building, a handsome structure, cost \$200,000. The city is lighted by electricity. The manufacturing industries include the shops of the Pennsylvania Railway Company the White wheel works, a walnut lumber firm employing 200 men, a company manufacturing gas-works machinery and apparatus, a brass foundry, breweries, wagon works, etc. Natural gas is largely utilized for both fuel and lighting. There is a fire department of forty men, and a police department of thirty-one men. The assessed valuation in 1890 was \$19,378,040.

**FORT WORTH**, the capital of Tarrant county, Texas, is situated on the west fork of the Trinity river, thirty-three miles west of Dallas, and 175 miles north of Austin. In 1880 it had less than 7,000 inhabitants; it has now (1890) 23,076. It is an important shipping point for cotton, grain, and live stock. The manufacturing interests include flouring mills, stove foundries, iron, jute, boots and shoes, granite, mattress, baking powder, crackers, and other factories, there being in all 128 establishments with an invested capital of \$1,320,000. There are eleven schools, costing \$176,000; nineteen churches, the Fort Worth University, and several fine public buildings, valued at \$264,000. Water is derived from 168 artesian wells, and there are thirty-eight miles of water mains, and fifty-three miles of sewers. The city has forty-four miles of electric street railroads, and an efficient fire and police department. The assessed valuation of city property was \$22,500,000 in 1889.

**FORUM**, the word employed by the Romans to de-

note any open place in which men congregated for the transaction of mercantile or political business. It is connected with *foris*, and the same root also appears in the Sanskrit *dvāra*, and the English *door*. In the laws of the Twelve Tables it occurs as equivalent to the vestibule of a tomb. In a Roman camp the forum was an open place immediately beside the *prætorium*; and perhaps the word may at one time have been applied generally to the space in front of any public building or gateway.

**FOSBROKE**, **THOMAS DUDLEY** (1770-1842), an English antiquary, was born in London, and was called Dudley after a cousin of that name, esquire of Lebotwood Hall in Shropshire. Fosbroke has given accounts of himself and family in most of his works, accompanied with lists and statements of facts supporting possible alliances. He was of an old Staffordshire family, no individual of which ever attained to any particular eminence. In 1810 Fosbroke removed to Walford in Herefordshire, and passed there the remainder of his life, as curate till 1830, and afterward as vicar of the parish. In 1796 he published the *Economy of Monastic Life*, which is, according to his own account, "a poem in Spenserian measure and style, written upon Darwin's doctrine of using only precise ideas of picturesque effect, chiefly founded on the sense of vision." Whatever all that may mean the poem is entirely unreadable, although "the reviews were favorable." Fosbroke was in the early part of this century a regular contributor to the *Gentleman's Magazine* of both original articles and reviews.

**FOSCARI**, **FRANCESCO** (d. 1457), doge of Venice, was born probably about 1372. He was of a patrician family, early displayed an ambitious temper, and rose to high honors in the state. He was already a member of the great council, when in 1412 he was named one of the guardians of the young marquis of Mantua; and by his wise administration he won the gratitude both of his ward and of the people. In 1421, being then one of the *procuratori* of St. Mark, he zealously advocated war on behalf of Florence against the powerful duke of Milan. The reigning doge, Tommaso Mocenigo, was opposed to this policy; and when dying, two years later, he warned his countrymen against electing Foscari as his successor, on the ground that he would plunge Venice into a disastrous war. The warning, however, was ineffectual; for after six days' deliberation, with nine scrutinies, Foscari was elected doge. His success was insured by bribery on a large scale. In proclaiming his election, a significant omission was made from the customary formula, the words which recognized the popular share in the appointment being entirely dropped. The ancient formula was never again used. Florence continued to press for an alliance with Venice against Milan, and the negotiations were still going on when, in 1425, the famous Carmagnola, who had for eight years commanded the Milanese armies and made many conquests for his master, the duke Filippo Maria, arrived at Venice, a fugitive in disgrace. His influence gave the decisive impulse to the hesitating Venetians; and in January, 1426, a league was formed and war was declared against Milan, Carmagnola being appointed captain-general of the army of Venice. Brescia and Cremona were conquered for Venice, and the war was carried on with alternation of success and failure and intervals of peace till 1433, when Foscari consented to treat, and peace was signed at Ferrara. The doge then offered his abdication, but the senate refused to accept it. After another troublous period of nine years he renewed his proposal, when the senate not only refused as before, but exacted from him an oath that he would retain his sovereignty for life. To



the toils and harassment of office and of war were added, during his remaining years, great family sorrows. He had four sons, three of whom were already dead. The fourth, Giacompo, connected himself by marriage in 1441 with the noble house of Contarini. Within four years of this event, Giacompo was denounced to the council of ten as having received presents from several foreign princes, one of the highest offenses a noble could be guilty of. He was tortured in the presence of his father, and, having made a confession, was condemned to perpetual banishment to Napoli di Romania. The aged doge was compelled to pronounce the sentence on his son. Five years later (1450), the assassination of Hermolas Donati, one of the ten, took place at Venice, and suspicion fastened on the banished Giacompo, one of whose servants was seen at Venice at the time. The servant was arrested and repeatedly tortured, but no confession was wrung from him. Giacompo was then recalled from his place of exile, was again put on the rack in his father's presence, and although not a particle of evidence was to be had against him, he was condemned and banished to the isle of Candia. The real assassin was afterward discovered, but the sentence against Giacompo was unrevoked. He was forbidden all communication with his wife and family, and life became an intolerable burden. In 1456 he wrote a request to the duke of Milan to intercede for him, and purposely left the letter open and discoverable. It was presented to the council of ten, and his end was gained, for he was immediately summoned to his native city to answer the charge of seeking foreign intercession. For the third time he was examined before his father, the doge. This time he confessed the crime of which he was accused. He was nevertheless put on the rack no less than thirty times with a view to extort a declaration of innocence, and this in his father's presence. But it was in vain, and the wretched man, torn and dislocated, was once more banished. He died shortly afterward in Candia. The father henceforth remained in retirement, incapable of discharging the duties of his office. At length through the intrigue of Giacompo Loredano, a member of a family which had an hereditary feud with the Foscari, the council were induced to request his abdication. He pleaded his oath not to resign, which they had compelled him to take; but they discharged him of it, declared the dogate vacant, gave him a pension, and expelled him from the palace (1457). They wished him to withdraw by a private staircase to escape the notice of the people, but this he firmly refused to do. Supported by his brother, he slowly descended the giants' stairs, and with the parting words — "My services brought me within these walls, the malice of my enemies drives me away" — he took his leave (October 25th). A decree of the council prohibited any mention of his name, under penalty of death, thus suppressing all expression of popular regret. On the 30th of the same month his successor was elected, and the announcement of the election by the bell of the campanile agitated him so violently that he ruptured a blood-vessel and died in a few hours. One year after his death it was declared that the council of ten had exceeded their authority. The melancholy story of the Foscari furnished Byron with a theme for a tragedy, and is narrated by Rogers in one section of his *Italy* — the two poems being published within a few days of each other (1821).

FOSCARINI, MARCO, doge of Venice, historian, was born January 30, 1696. He was of an illustrious patrician family, and his fine character and superior abilities opened for him at an early age the path of public service and advancement. He rose through the regular stages of office to be *cavaliere* and *procuratore*

of St. Mark, and was nominated historiographer of the republic. It was intended that he should take up and continue the story from the point to which it had been brought by Michele Foscarini and the senator Garzoni. But his services were turned into another channel. He was intrusted successively with important embassies to the courts of Vienna, Rome, and Turin, his task being to maintain the strict neutrality of Venice in the wars between the French and the imperialists. During these embassies he drew up, after the manner of Venetian ambassadors, reports of his negotiations and proceedings, and also of his observations of affairs at the various courts. Thus removed from Venice and from access to the public archives, from which the materials of his projected history must have been drawn, it was impossible for him to write it. He undertook, however, to collect materials for a literary history of his country, proposing to treat the subject under two heads, first the useful (or scientific) literature, and secondly the more strictly literary works. In 1752 appeared the first volume of the first division, in four books; and this remains a fragment, no more having been published. Foscarini, after his return from Turin, was placed at the head of the university of Padua, in the conduct of which he brought about some important reforms. In 1762 he rose to the highest dignity of the state, being elected to succeed Francesco Loredano as doge. Among the other literary remains of Foscarini are an oration on the administration of Dalmatia, not published till 1831; an account of the imperial court and administration, published in 1843; a report on his Sardinian embassy, etc.; besides several unpublished pieces. He held the dogate for ten months only, dying on March 31, 1763.

FOSCARINI, MICHELE, Venetian historian, was born in 1632. By the deaths of his father and mother he became head of his house at the age of nineteen. Of patrician rank, he entered upon official life in 1657, and after filling various posts became in 1662 one of the *avogadori* of the republic. Two years later he was appointed governor of Corfu with the title of *provveditore* and captain. Returning to Venice in 1668, he was selected to fill some of the most honorable offices in the republic. On the death of Battista Nani in 1678, Foscarini was called to succeed him as historiographer of Venice. He continued the history begun by Bembo, and carried on by other writers, from 1669 to 1690, but had not quite completed his work when he died suddenly, March 31, 1692.

FOSCOLO, UGO, the Italian writer who next to Alfieri has most contributed to free the literature of his country from the pedantries and affectations of the seventeenth and eighteenth centuries, was born at Zante on January 26, 1778. On the death of his father, a physician at Spalatro, in Dalmatia, the family removed to Venice, and in the university of Padua Foscolo prosecuted the studies begun in the Dalmatian grammar school. The fact that among his Paduan masters was the Abbé Cesarotti, whose version of Ossian had made that work highly popular in Italy, was not without influence on Foscolo's literary tastes, and his early knowledge of modern facilitated his studies in ancient Greek. His literary ambition revealed itself by the appearance in 1797 of his tragedy *Tieste* — a production which obtained a certain degree of success. Foscolo, who from causes not clearly explained, had changed his Christian name Niccolo to that of Ugo, now began to take an active part in the stormy political discussions which the fall of the republic of Venice had provoked. He was a prominent member of the national committees, and addressed an ode to Napoleon the liberator, expecting from the military successes of the French general,



not merely the overthrow of the effete Venetian oligarchy, but the establishment of a free republican government. The treaty of Campo Formio (Oct, 17, 1797), by which Napoleon handed Venice over to the Austrians, gave a rude shock to Foscolo, but did not quite destroy his hopes. The state of mind produced by that shock is reflected in the letters of Jacopo Ortis, a species of political Werther—for the hero of Foscolo embodies the mental sufferings and suicide of an undeceived Italian patriot just as the hero of Goethe places before us the too delicate sensitiveness embittering and at last cutting short the life of a private German scholar. The story of Foscolo, like that of Goethe, had a groundwork of melancholy fact. Jacopo Ortis had been a real personage; he was a young student of Padua, and committed suicide there under circumstances akin to those described by Foscolo. At this period Foscolo's mind appears to have been only too familiar with the thought of suicide. Cato and the many classical examples of self-destruction scattered through the pages of Plutarch appealed to imaginations of young Italian patriots as they had done in France to those of the heroes and heroines of the Gironde. In the case of Foscolo as in that of Goethe, the effect produced on the writer's mind by the composition of the work seems to have been beneficial. He had seen the ideal of a great national future rudely shattered; but he did not despair of his country, and sought relief in now turning to gaze on the ideal of a great national poet. At Milan, whither he repaired after the fall of Venice, he was engaged in other literary pursuits besides the composition of *Ortis*. The friendship formed there with the great poet Parini was ever afterward remembered with pride and gratitude. The friendship formed with another celebrated Milanese poet soon gave place to a feeling of bitter enmity. Still hoping that his country would be freed by Napoleon, he served as a volunteer in the French army, took part in the battle of the Trebbia and the siege of Genoa, was wounded and made prisoner. When released he returned to Milan, and there gave the last touches to his *Ortis*, published a translation of and commentary upon *Callimachus*, commenced a version of the *Iliad*, and began his translation of Sterne's *Sentimental Journey*. The result of a memorandum prepared for Lyons, where along with other Italian delegates he was to have laid before Napoleon the state of Italy, only proved that the views cherished by him for his country were too bold to be even submitted to the dictator of France. The year 1807 witnessed the appearance of his *Carme sui Sepolcri*, of which the entire spirit and language may be described as a sublime effort to seek refuge in the past from the misery of the present and the darkness of the future. The mighty dead are summoned from their tombs, as ages before they had been in the master-pieces of Greek oratory, to fight again the battles of their country. The inaugural lecture on the origin and duty of literature, delivered by Foscolo in January, 1809, when appointed to the chair of Italian eloquence at Pavia, was conceived in the same spirit. In this lecture Foscolo urged his young countrymen to study letters, not in obedience to academic traditions, but in their relation to individual and national life and growth. The sensation produced by this lecture had no slight share in provoking the decree of Napoleon by which the chair of national eloquence was abolished in all the Italian universities. Soon afterward Foscolo's tragedy of *Ajax* was represented but with little success at Milan, and its supposed allusions to Napoleon rendering the author an object of suspicion, he was forced to remove from Milan to Tuscany. The chief fruits of his stay in Florence are the tragedy of *Ricciarda*, the *Ode to the Graces*, left

unfinished, and the completion of his version of the *Sentimental Journey*. He returned to Milan in 1813, until the entry of the Austrians; thence he passed into Switzerland, where he wrote a fierce satire in Latin on his political and literary opponents; and finally he sought the shores of England at the close of 1816.

During the eleven years passed by Foscolo in London, until his death there, he enjoyed all the social distinction which the most brilliant circles of the English capital confer on foreigners of political and literary renown, and experienced all the misery which follows on a disregard of the first conditions of domestic economy. His contributions to the *Edinburgh* and *Quarterly Reviews*, his dissertations in Italian on the text of Dante and Boccaccio, and still more his English essays on Petrarch, of which the value was enhanced by Lady Dacre's admirable translations of some of Petrarch's finest sonnets, heightened his previous fame as a man of letters. But his want of care and forethought in pecuniary matters involved him in much embarrassment, and at last consigned him to a prison; and when released, he felt bitterly the change in his social position, and the coldness now shown to him by many whom he had been accustomed to regard as friends. His general bearing in society—if we may accept on this point the testimony of so keen an observer and so tolerant a man as Sir Walter Scott—had unhappily not been such as to gain and retain lasting friendships. He died at Turnham Green on October 10, 1827.

FOSS, EDWARD (1787-1870), a solicitor by profession, was the author of a considerable number of works on legal antiquities, the most important of which are his *Judges of England*, in nine vols., and his *Biographia Juridica, a Biographical Dictionary of English Judges*.

FOSSANO, a city of Italy, in the province of Cuneo, forty miles from Turin. It is a well-built and prosperous place, and its cathedral and great four-towered castle, founded in 1314, form its most striking features. It has considerable manufactures of silk and leather, and is the center of a large grain and cattle trade. Population of the town, 8,000, and of the commune, about 18,000.

FOSSANO, AMBROGIO STEFANI DA, better known as Ambrogio Borgognone, or simply Il Borgognone, was the foremost painter of the Milanese school, so far as it is possible to speak of a Milanese school independently of Leonardo da Vinci. We are not precisely informed of the dates either of the death or the birth of Borgognone. His fame is principally associated with that of one great building, the Certosa, or church and convent of the Carthusians at Pavia, for which he worked much and in many different ways.

FOSSOMBRONE, a town of Italy, in the province of Pesaro and Urbino, about seven miles from Urbino, on the left bank of the Metauro, which is there crossed by a fine bridge of a single arch.

FOSSOMBRONI, VITTORIO, a Tuscan statesman and mathematician, was born at Arezzo in 1754. He was author of many treatises on mathematical and mechanical science, most of them relating to hydraulics. At the age of seventy-eight he married, and twelve years afterward died, in 1844, at the age of ninety.

FOSTER, JOHN, an English author and dissenting minister, generally known as the "Essayist," was born in a small farmhouse near Halifax, Yorkshire, September 17, 1770. There is little information as to the manner in which he obtained his primary education, but at an early period he had acquired a great taste for reading, to gratify which he sometimes shut himself up alone in



a barn, afterward working at his loom "like a horse," to make up for lost time. He had also at this period "a passion for making pictures with a pen." Shortly after completing his seventeenth year he became a member of the Baptist church at Hebden Bridge, with which his parents were connected; and with the view of preparing himself for the ministerial office, he began about the same time to attend a seminary at Brearley Hall conducted by his pastor, Doctor Fawcett.

After remaining three years at Brearley Hall he was admitted to the Baptist College, Bristol, and on finishing his course of study at this institution, he obtained an engagement at Newcastle-on-Tyne, where he preached to an audience of less than a hundred persons, in a small and dingy room situated near the river at the top of a flight of stairs called Tuthill stairs. At Newcastle he remained only three months. In the beginning of 1793 he proceeded to Dublin, where after failing as a preacher, he attempted to revive a classical and mathematical school, but with so little success that he did not prosecute the experiment for more than eight or nine months. In 1804, chiefly through the recommendation of Robert Hall, he became pastor of a congregation at Frome, but a swelling in the thyroid gland compelled him in 1806 to resign his charge. In the same year he published the volume of *Essays*, on which his literary fame most largely if not mainly rests. They were written in the form of letters addressed to the lady whom he afterward married, and consist of four papers: *On a Man writing Memoirs of Himself*; *On Decision of Character*; *On the Application of the Epithet Romantic*; and *On some Causes by which Evangelical Religion has been rendered unacceptable to Men of Cultivated Taste*. The success of this work was immediate, and was so considerable that on resigning his charge he determined to adopt literature as his profession. The *Electric Review* was the only periodical with which he established a connection; but his contributions to that journal, which were begun in 1807, number no fewer than 185 articles. In 1821 he removed to Stapleton near Bristol, and in 1822 he began a series of fortnightly lectures at Broadmead Chapel, Bristol, which were afterward published in two volumes. On the settlement of Robert Hall at Bristol this service was discontinued, as in such circumstances it appeared to Foster to be "altogether superfluous, and even bordering on impertinent." The health of Foster during the later years of his life was somewhat infirm, the result chiefly of the toil and effort of literary composition; and the death of his only son, his wife, and the greater number of his most intimate friends combined with his bodily ailments to lend additional somberness to his manner of regarding the events and arrangements of the present world—the "visage of death" being almost his "one remaining luminary." He died at Stapleton, October 15, 1843.

FOSTER, STEPHEN COLLINS, a prolific American song and ballad writer, was born at Allegheny, Pa., July 4, 1826. He was the youngest child of a merchant who became mayor of his native city, and a member of the State legislature, and was related by marriage to President Buchanan. As a boy Stephen was delicate, and through life he was of a quiet, retiring disposition—in strong contrast with the spirit of many of his most popular songs. He early showed talent for music, and played upon several instruments; he also acquired a fair knowledge of French and German. When thirteen years old he wrote a song afterward published in his works—*Sadly to Mine Heart Appealing*. At sixteen he wrote the then much admired *Open thy Lattice, Love*; at seventeen he entered his brother's business house, Cincinnati, Ohio, where he

remained about three years, composing meanwhile such popular pieces as *Old Uncle Ned*, *O Susanna!* etc. For the latter he received \$100, which induced him to adopt song-writing as a vocation. His chief success were songs written for the negro melodists or "minstrels." Besides those mentioned, the following attained great popularity, viz., *Nelly was a Lady*, *Old Kentucky Home*, *Old Folks at Home*, *Massa's in the Cold Ground*, etc. For these and other songs the composer received considerable sums, *Old Folks at Home*, bringing him, it is said, \$15,000. For the most of his songs Foster wrote both words and music. His reputation rest chiefly on his negro melodies, many of which have been popular on both sides of the Atlantic, and sung in many tongues. His later songs were of a more refined and somewhat higher order of musical composition, and after his mother's death were characterized by melancholy. Among these are *Old Dog Tray*, *Gentle Annie*, *Willie, we Have Missed You*, etc. His *Come where My Love Lies Dreaming* is considered one of the most pleasing and popular vocal quartets ever written. Composers and poets of celebrity recognized his peculiar talent, and great musicians incorporated many of his melodies into concert fantasias. He died at New York, January 13, 1864.

FOSTORIA, a town of Seneca county, Ohio, is situated twenty-one miles southwest of Fremont, and thirteen miles from Tiffin, at the intersection of four railroads. It contains two banks, three hotels, an opera house, six churches, a normal school, and three newspaper offices. The manufacturing interests include flouring mills, saw and planing mills, iron foundries, etc., and the population is about 6,000.

FOTHERGILL, JOHN (1712–1780), F.R.S., an eminent physician, a member of the Society of Friends, was born at Carr End in Yorkshire. He took the degree of M.D. at Edinburgh in 1736. After visiting the Continent, he in 1740 settled in London, and gained there an extensive practice. In the epidemics of influenza in 1775 and 1776 he is said to have had sixty patients daily. In his leisure he made a study of conchology and botany; and after his death, which took place in December, 1780, his collections of shells, prints, and other objects were sold for a considerable sum. Fothergill was a licentiate of the College of Physicians of London, and a fellow of that of Edinburgh, of which he was a great benefactor. He was the patron of Sidney Parkinson, the South Sea voyager. A translation of the Bible (1764 seq.) by Anthony Purver, a Quaker, was made and printed at his expense. His pamphlet entitled *Account of the Sore Throat attended with Ulcers* (1748, 2d ed. 1754), prepared with the assistance of information supplied by Dr. Letherland, attracted great attention, and was translated into several languages. His works were edited by Dr. John Elliot (1781), by Gilbert Thomas (1782), and by Dr. Lettsom (1783).

FOUCAULT, JEAN BERNARD LÉON, a distinguished French physician, was the son of a well-known publisher at Paris, where he was born September 18, 1819. In 1849 he contributed to the *Comptes Rendus* of the Academy of Sciences a description of an electromagnetic regulator for the electric lamp, and, in conjunction with Regnault, a paper on binocular vision. By the use of a revolving mirror similar to that used by Wheatstone for measuring the rapidity of electric currents, but having a concave mirror centered in its axis, he was enabled in 1850 to demonstrate the greater velocity of light in air than in water, and to establish the law deduced from the undulatory theory that the velocity of light in different media is inversely as the refractive indices of the media. In the same year he was cre-



ated a chevalier of the Legion of Honor. For his demonstration in 1851 of the diurnal motion of the earth by rotation of the plane of oscillation of a freely suspended, long, and heavy pendulum in an east-southwest direction, exhibited by him at the Pantheon in Paris, and again in the following year by means of his invention the gyroscope, he in 1855 received the Copley medal of the Royal Society of London. He was also in 1855 made physical assistant in the imperial observatory at Paris. In September of that year he discovered that the force required for the rotation of a copper disc moving in its own plane becomes greater, the disc at the same time growing hotter, when the disc is made to rotate with its rim between the poles of a horse-shoe magnet. Foucault invented in 1857 the polarizer which bears his name, and in the succeeding year a method of giving to the speculum of reflecting telescopes the form of a spheroid or a paraboloid of revolution. His reflector for the great telescope in the Paris observatory was mounted in June, 1859. With Wheatstone's revolving mirror he, in 1862, determined the absolute velocity of light to be 298,000 kilometers (about 185,000 miles) a second, or 10,000 kilometers less than that obtained by previous experimenters. He died in 1868.

FOUCHÉ, JOSEPH, duke of Otranto, minister of police under Napoleon I., was born in a small village near Nantes, May 26, 1763. He was the son of a ship captain, and at the age of nine years began the study of mathematics at the college of his native place, with the view of entering the merchant marine. That such a calling would have proved congenial to him is not very probable, and at any rate it presented so little attraction to his youthful fancy that he induced his father to consent to the abandonment of his intention, and to permit him to continue his studies at Paris under the superintendence of the principal of the oratory. He afterward taught successively in the colleges of Juilly, Arras, and Vendôme, and at the time of the Revolution he was *préfet des études* at Nantes. He now renounced his connection with the ecclesiastical profession, and in 1792 succeeded in being chosen one of the national deputies for Loire-Inférieure. In this capacity he made a violent speech in support of the execution of Louis XVI., without respite and without appeal to the people, taunting those who hesitated to adopt such an extreme measure with "trembling before the shade of a king." In the midst of the political chaos he determined to "ride on the whirlwind and direct the storm;" though he had little or no interest in moral speculation, he became an ardent assertor of atheism; and, though devoid of all political predilections, and actuated in his political purposes simply by a cool calculation of advantages that was seldom if ever surprised or ruffled even by the most critical contingencies, he soon manifested a zeal for republicanism which exceeded that of the wildest enthusiasts of that exceptional time. Having at the end of 1793 been commissioned to put in operation the law *des suspects* in the department of Nièvre, then one of the centers of the royalist sympathizers, he not only succeeded in completely crushing all insurrectionary symptoms, but initiated the movement for the spoliation of the churches, by which the treasury was supplied with money for the campaign of 1794; and he also further inaugurated the age of reason by suppressing the priests and causing to be inscribed on the doors of the cemeteries a sentence afterward generally adopted for this purpose — *La mort est un sommeil éternel*. In November of the same year he was appointed, along with Collot d'Herbois, to execute the decree of the convention against the royalist city of Lyons; and here he vied with his colleague in a mania for destruction and bloodshed, inditing bombastic

regrets that the mine and the guillotine did their work too slowly to accord with the impatience of the republic, or to express the omnipotence of the people. This devoted enthusiasm for freedom led to his being elected president of the Jacobin Club, June 4, 1794, soon after his return to Paris. He now so far allowed his audacity to overcome his discretion as to make some derisive allusions to the part played in the fête de l'Être Suprême by Robespierre, who on that account denounced him as an impostor and speculator, and procured his expulsion from the society. Fouché had erred, however, only by a too quick anticipation of public opinion, for the execution of Robespierre followed on July 25th. The star of Fouché was thus for a short time again in the ascendant; but having awakened distrust by some new intrigues, he was denounced as a terrorist, expelled by the convention on August 9, 1795, and placed under arrest. He obtained his freedom by the amnesty of October 26 following; and having obtained the confidence of the socialist Babeuf, and revealed his conspiracy to Barras, then president of the directory, he was rewarded by an interest in the contracts of the army, and by being appointed, in 1798, ambassador to the Cisalpine republic. Soon afterward his intrigues against the directory of Milan led to his recall, but when the party of Barras again came into power, he was appointed to the Hague. There he remained only a few months, returning to Paris to enter upon his famous career as minister of police. In this capacity he for some years exercised an influence on the internal affairs of France perhaps greater than that of any one else; and it was chiefly owing to his well-chosen measures of repression, his ready and dexterous use of expedients, his almost omniscient faculty of detection, and his just appreciation of political contingencies, that at this critical period in France's history the reign of anarchy was averted. Recognizing the necessity of a new political departure, he suppressed the Jacobin clubs and newspapers, and was concerned in instigating the beginning of a reaction toward monarchical principles. Though he failed to effect an understanding between Barras and Napoleon, he resolved rather to desert his patron than share his overthrow, and exerted all his powers of management and finesse to bring the *coup d'état* of the 18th Brumaire to a successful termination. Besides taking an important though carefully guarded share in the preliminary negotiations he suspended in the name of the directory the twelve municipalities of Paris, tranquilized the citizens by posting on the walls reassuring intimations, and took the precaution of shutting the gates of Paris to prevent the fugitive deputies from re-entering the city.

Under the consulate, Fouché, notwithstanding the opposition of Sieyès, was continued minister of police, partly because he was to be dreaded as an opponent, and partly because no one else could bear comparison with him in fitness for the office. Its duties he discharged, not only with unequaled tact and discretion, but with a justice and mildness rendered possible only by his perfect confidence in his superior cunning. At the same time there was necessarily attached to it a very great irresponsible power, and far from neglecting to make undue use of this he took care to lend an additional appearance of necessity and value to his services by a continual supply of political fomentations. If his audacity and assumption aroused the jealousy of Napoleon, his cool impenetrability no less disconcerted him, and matters were not improved by the ludicrous blunders of the secret police which Napoleon had the folly to employ, in order both to test his minister's fidelity and render him less indispensable. Actuated therefore



most probably by a regard to his own position, Fouché endeavored to prevent a too rapid abandonment of the lines of republicanism, and deprecated as imprudent the means that were being used toward the establishment of a monarchical government. Such advice doubtless increased Napoleon's irritation and distrust, and on becoming consul for life in 1802, he determined to rid himself of the galling fetters of his minister's ascendancy. He did this, however, with great caution and respect; and while he suppressed the office as no longer necessary, he conferred on Fouché the dignity of a senator, and presented him with half the police reserve funds. The association of the functions of the old office with those of the ministry of justice did not prove a happy arrangement; and Fouché by maintaining for his own purposes the same system of espionage as formerly, was able, by revealing the Georges conspiracy, to reassert his influence in the affairs of state. Divining Napoleon's secret wishes and intentions, he now took every opportunity to press upon him the advisability of immediately assuming the monarchical crown, and applied himself to the furtherance of this object with an ostentatious zeal that was doubtless meant to suggest that he was almost the sole agent in determining events toward that end. And indeed he might, after Napoleon, justly claim the chief merit of that great political change, for at any rate the smoothness with which it was accomplished was greatly due to Fouché's skillful management.

After Napoleon's coronation Fouché was therefore re-installed in his old office, July 4, 1804, uniting with its functions those of the ministry of the interior. In this position he took a very prominent part in the rule of France under Napoleon, and to some extent rivaled his master in influence; for if the empire gained glory by Napoleon's achievements, it owed its internal harmony to Fouché, who had for a time the entire direction of its administration. On the revival of the titles of nobility he was created duke of Otranto, and it appeared as if his tenure of office were indissolubly connected with the empire's stability. The bond between him and the emperor was, however, solely one of interest, and the very antipodes of one of affection and mutual esteem. His imperturbable self-control, his connection with the old republicans, the obscurity and mystery in which he shrouded his intentions, and his power of secret strategy gained him almost a kind of mastery over the arbitrary spirit of Napoleon, but it was a mastery borne both with impatience and resentment. Apart from this, his cold and vulgar ambition and his cynical contempt for all unsubstantial glory irritated the sensitive egotism of Napoleon, whose magnificent projects he often pierced with shafts of truth that were too painfully effective, and whom he somewhat imprudently tormented with warnings as to the necessity of limiting his designs of conquest. When matters were in this critical condition, they were brought to a crisis by a proclamation of Fouché calling on France — then threatened by the English invasion — to prove that Napoleon's presence was not necessary to scatter his enemies. The proclamation was effectual; but on Napoleon's return to Paris Fouché was deprived of the ministry of the interior. Shortly afterward he sent an agent to England to carry on negotiations with the English Government, in ignorance that Napoleon had sent another for the same purpose; and the English minister, suspecting a trick, declined all further negotiations. This mischance completed Fouché's disgrace; he ceased to be minister of police, June 3, 1810; and to secure his absence from France, he was appointed governor of Rome. While delaying his departure he was requested to deliver up the autograph letters of Napoleon and other Government documents in his possession; and his

answer that they were all destroyed was deemed so little satisfactory that he found it expedient to go into voluntary exile. On delivering up the papers the destruction of which he had asserted, he was afterward permitted to return to his estate at Pont-Carré; but in 1813 Napoleon judged it prudent to appoint him governor of Illyria, after which he was sent to Rome to watch the movements of Murat. Being recalled to France some time before the entrance of the allies into Paris, he in anticipation of events came to an understanding with Talleyrand, and becoming one of the principal members of the Provisional Government, proposed that a deputation should be sent to the Comte d'Artois, brother of Louis XVIII. He afterward wrote letters to the king recommending the adoption of certain measures fitted to reconcile the opponents of the Bourbon dynasty, and on April 25th addressed a letter to Napoleon at Elba, advising him, instead of making an effort to remount the throne of France, to seek a sphere for his ambition in America, "where his genius would be admired without being feared." On the news of Napoleon's escape from Elba the Government of Louis offered Fouché the portfolio of police, but he declined it on the ground that the Government could no longer hold its position. Next day he was ordered to be arrested, but deluding by a clever stratagem the officers sent for that purpose, he escaped to the hôtel of Hortense Beauharnais, and received on the following day his old office from the hands of Napoleon. He now determined merely to prepare for Napoleon's downfall, which he saw to be imminent; and besides securing the confidence of both patriots and royalists, he opened a communication with the allies. After the battle of Waterloo it was therefore to him that all eyes turned for guidance; and, becoming the head of the provisional Government, he succeeded in producing the impression that his skillful diplomacy had saved Paris from extreme humiliation. Having played such an important part in this political crisis, his name could not be omitted from the list of the new Government, and he received his old office from the king, of whose brother's death he had been one of the principal instigators. His dexterity, however, had now set itself a task for which it was incompetent; and gradually finding his position untenable, he resigned office September 19, 1815. As a kind of solatium he was appointed ambassador to Dresden; but on the passing of the law of banishment against those who had voted for the death of Louis XVI., he retired to Prague. He became a naturalized Austrian subject in 1818, and died at Trieste, December 25, 1820, in possession of enormous wealth.

FOUCHER, SIMON, a sceptical writer during the latter part of the seventeenth century, was born at Dijon on March 1, 1644. Extremely little is known of his life. He was the son of a wealthy merchant at Dijon, and appears to have taken orders at a very early age. For some years he held the possession of honorary canon at Dijon, but this he resigned in order to take up residence in Paris. He graduated at the Sorbonne, and spent the remainder of his life in literary work in Paris. Foucher's name is now almost completely forgotten, but in his day he enjoyed considerable repute as a keen opponent of Malebranche. He died in 1696.

FOUGÈRES, a town of France, at the head of an arrondissement in the department of Ille-et-Vilaine, situated for the most part on an eminence near the left bank of the Nançon, a tributary of the Couesnon, by which the lower town is not unfrequently laid under water.

FOULD, ACHILLE, French financier and politician, was born at Paris, November 17, 1800. The son of a rich Jewish banker, he was associated with and after-



ward succeeded his father in the management of the business. As early as 1842 he entered political life, having been elected in that year as a deputy for the department of the Hautes Pyrénées. From that time to his death he actively busied himself with the affairs of his country. He readily acquiesced in the revolution of February, 1848, and is said to have exercised a decided influence in financial matters on the provincial government then formed. He shortly afterward published two pamphlets against the use of paper money, entitled, *Pas d'Assignats!* and *Opinion de M. A. Fould sur les Assignats*. During the presidency of Louis Napoleon he was four times minister of finance, and took a leading part in the economical reforms then made in France. His strong conservative tendencies led him to oppose the doctrine of free trade, and disposed him to hail the "Coup d'Etat" and the new empire. On January 25, 1852, in consequence of the decree confiscating the property of the Orleans family, he resigned the office of minister of finance, but was on the same day appointed senator, and soon after rejoined the government as minister of state and of the imperial household. In this capacity he directed the Paris exhibition of 1855. The events of November, 1860, led once more to his resignation, but he was recalled to the ministry of finance in November of the following year, and retained office until the publication of the imperial letter of January 19, 1867, when M. Emile Ollivier became the chief adviser of the emperor. During his last tenure of office he had reduced the floating debt, which the Mexican war had considerably increased, by the negotiation of a loan of 300,000,000 francs (1863). Fould, besides uncommon financial abilities, had a taste for the fine arts, which he developed and refined during his youth by visiting Italy and the eastern coasts of the Mediterranean. In 1857 he was made an honorary member of the Academy of the Fine Arts. He died at Tarbes on October 5, 1867.

**FOULIS**, ANDREW and ROBERT, two learned Scotch printers and publishers, whose enterprise and devotion to the interests of the higher education deserve to be gratefully remembered. Robert, the elder of the two, was born in 1707 and his brother in 1712. Upward of 500 separate publications proceeded from their press. Andrew died in 1775, and his brother went to London, hoping to realize a large sum by the sale of his pictures. They were sold for much less than he anticipated, and he returned broken-hearted to Scotland, where he died, at Edinburgh, in June, 1776.

**FOUNDING**, the art of reproducing solid objects in the metal or other fusible substances by pouring the melted substance into molds. It is also known as *casting*, and objects so produced are said to be of cast metal. Works where founding or casting is carried on are termed foundries, and their proprietors founders. The verb to found is not, however, in current use, being almost entirely replaced by cast. The root of the word is the Latin *fundus*.

**FOUNDLING HOSPITALS** are intended to save children from death by exposure, and it is therefore difficult to describe them properly apart from the general subject of infanticide. This practice was extremely common among nearly all ancient nations. It may still be studied in such horrible institutions of savage life as the Areoi of the Society Islands, or the Meebra of New South Wales; and it may be found in the greatest variety of form among the tribes of Hindustan. The motives which suggested the practice were sometimes superstitious, more often extremely practical. As the natives of Gujarat said to Major Walker, "Pay our daughters' marriage portions, and they shall live." The feeling here was one of social dignity mixed with the strong contempt which many savages express for the

single life. But in most cases children were killed simply because the parents, having no realized wealth, did not expect to be able to clothe and feed them. This is especially seen in the frequent killing of female children and those who are sick or deformed. In some places the practice has been confined to the children of concubines, of stranger fathers, or of mothers dying from sickness. In the earliest society the right to kill belonged to the father, sometimes assisted by a person skilled in omens, or by a council of friends. But the usage soon hardened into a binding custom or into express legislation. Thus in the exogamous communities girls were clearly a source, not of weakness only, but of danger. At a much later period the number of a family, or of the daughters, was often fixed by law, and both Lycurgus and the Roman decemvirs directed the slaughter of deformed children. Pliny the elder defends infanticide as a necessary check on population, and Quintilian and Seneca bear witness to the frightful mortality among children exposed, and the systematic mutilation of those who survived. The legislation of Constantine did not go beyond a declaration that the killing of a son was parricide, but the famous law of Valentinian, Valens and Gratian punished exposure by the loss of the *patria potestas*, and secured the rights of the foster-father. Finally, by Novel 153, Justinian declared that the foundling should no longer be the slave of the foster-father, but should be free. This, however, did not affect western Europe, where social disorder and the recurrence of famine led to extensive sales of children. Against this evil, which was noticed by several councils, the church provided a rough system of relief, children being deposited (*jactati*) in marble shells at the church doors, and tended first by the *matricularii* or male nurses, and then by the *nutricarii* or foster-parents. Nothing is known of the brephotrophia which are said to have existed in the Eastern empire at this time, nor of the public tables (such as Valleiana, Bæbi-ana) which particular emperors are said to have provided for the support of children. The earlier traditions of a hospital at the Cynosarges in Athens and at the Columna Lactaria in the vegetable market at Rome are disputed. It is in the seventh and eighth centuries that definite institutions for foundlings are established in such towns as Trèves, Milan, and Montpellier. In the fifteenth century Garcias, archbishop of Valentia, is a conspicuous figure in this charitable work; but his fame is entirely eclipsed by that of St. Vincent de Paul, who in the reign of Louis XIII., with the help of the countess of Joigny, Mme. le Gras, and other religious ladies, rescued the foundlings of Paris from the horrors of a primitive institution named La Couche (Rue St. Landry), and ultimately obtained from Louis XIV. the use of the Bicêtre for their accommodation. Letters patent were granted to the Paris hospital in 1670. The Hôtel-Dieu of Lyons was the next in importance. No provision, however, was made outside the great towns; the houses in the cities were overcrowded and administered with laxity; and in 1784 Necker prophesied that the state would yet be seriously embarrassed by this increasing evil. From 1452 to 1789 the law had imposed on the *seigneurs de haut justice* the duty of succoring children found deserted on their territories. The first constitutions of the Revolution undertook as a state debt the support of every foundling. For a time premiums were given to the mothers of illegitimate children, the "enfants de la patrie." By the law of 12 Brumaire, An. II. "Toute recherche de la paternité est interdite," while by art. 341 of the Code Napoléon, "la recherche de la paternité est admise."

**France.**—The present laws of France relating to this part of what is called L'Assistance Publique



are the decree of January, 1811, the instruction of February, 1823, the decree of March 5, 1852, and the law of May 5, 1869. These laws carry out the general principles of the law of 7th Frimaire An. V., which completely decentralized the system of national poor relief established by the Revolution. The "enfants assistés" include, besides orphans and foundlings proper, infants brought by their parents into the asylum, and those born in lying-in hospitals and left there by their mothers, children of persons undergoing a judicial sentence, children temporarily taken in while their parents are in the hospital, and an increasing number of children, legitimate, illegitimate, and orphans, who are supported by a system of out-door relief. The asylum which receives them is a departmental and not a communal institution. The state pays only the cost of inspection and superintendence.

*Belgium.*—In this country the arrangements for the relief of foundlings and the appropriation of public funds for that purpose very much resemble those in France. The Commissions des Hospices Civiles, however, are purely communal bodies, although they receive pecuniary assistance from both the departments and the state.

*Italy* is very rich in foundling hospitals, pure and simple, orphans and other destitute children being separately provided for. Piedmont has eighteen, Genoa has six, Lombardy has thirteen, and the Emilia has fifteen.

*Austria.*—In Austria foundling hospitals occupied a very prominent place in the general instructions, which, by rescript dated April 16, 1781, the emperor Joseph II. issued to the charitable endowment commission.

*Turkey.*—Under the Greek system of vestry relief, which works very efficiently at Constantinople, a large sum is spent on foundlings. There is no hospital, but the children are brought before the five members of the vestry or parish church committee, who, acting as the *coumbaros* or god-father, board out the child with some poor family for a small monthly payment, and afterward provide the child with some sort of remunerative work.

*Russia.*—Under the old Russian system of Peter I. foundlings were received at church windows by a staff of women paid by the state. But since the reign of Catherine II. the foundling hospitals have been in the hands of the provincial officer of public charity.

In *America* the foundling hospitals are chiefly private charities. There is a large one called the *Cuna* in the city of Mexico. The house for girls at Rio de Janeiro is once a year frequented by men in want of wives, each application being considered by the managers. In Brazil there are several houses of mercy for foundlings, and exposures are often made at the doors of private houses. In the large cities of the United States there are, in addition to denominational foundling hospitals (under the auspices of religious sodalities), departments in all of the public almshouses and asylums in which such unfortunates are received and reared.

*Great Britain.*—The Foundling Hospital of London was incorporated by Royal Charter in 1739 "for the maintenance and education of exposed and deserted young children." The petition of Captain Thomas Coram, who is entitled to the whole credit of the foundation, states as its objects "to prevent the frequent murders of poor, miserable children at their birth, and to suppress the inhuman custom of exposing new-born infants to perish in the streets."

**FOUNTAIN**, a spring of water. The term is applied in a restricted sense to such springs as, whether fed by natural or artificial means, have arrangements of human art at a point where the water emerges. Pure water is

so necessary to man, and the degree of plenty, constancy, and purity in which it is procured, transported, prepared for use, and distributed in populous districts is so fair a standard of civilization, that it hardly seems unreasonable in Pausanias to put it among the criteria, asking, with reference to Panopæus, if that can rightly be called a city which has neither ruler, gymnasium, forum, nor fountain of water. Among the Greeks we learn, mainly from Pausanias, that fountains were very common in the cities; and springs being very plentiful in Greece, little engineering skill was required to convey the water from place to place. Receptacles of sufficient size were made for it at the springs; and to maintain its purity, structures were raised inclosing and covering the receptacle.

It is not surprising that so beneficent an object as a spring of water should be connected with religious belief. It is certain that until modern times fountains have been in some way connected with religion of the people among whom they sprang, and dedicated to one or other of its personalities. In Greece they were dedicated to gods and goddesses, nymphs and heroes, and were frequently placed in or near temples. The references to fountains by Pausanias are frequent, but he gives no full descriptions. That of Pirene at Corinth (mentioned also by Herodotus) was formed of white stone, and contained a number of cells from which the pleasant water flowed into an open basin. Legend connects it with the nymph Pirene who shed such copious tears, when bewailing her son who had been slain by Diana, that she was changed into a fountain. The city of Corinth possessed many fountains. In one near the statues of Diana and Bellerophon, the water flowed through the hoofs of the horse Pegasus. The fountain of Glaucæ, inclosed in the Odeum, was dedicated to Glaucæ, because she was said to have thrown herself therein, believing that its waters could counteract the poisons of Medea. Another Corinthian fountain had a bronze statue of Neptune standing on a dolphin from which the water flowed. The fountain constructed by Theagenes at Megara was remarkable for its size and decorations, and for the number of its columns. One at Lerna was surrounded with pillars, and the structure contained a number of seats affording a cool summer retreat. Near Pharæ was a grove dedicated to Apollo, and in it a fountain of water. Pausanias gives a definite architectural detail when he says that a fountain at Patræ was reached from without by descending steps. Mystical, medicinal, surgical, and other qualities, as well as supernatural origin, were ascribed to fountains. One at Cyanæ near Lycia was said to possess the quality of endowing all persons descending into it with power to see whatever they desired to see; while the legends of fountains and other waters with strange powers to heal are numerous in many lands. The fountain Enneacrunus at Athens was called Callirrhœ before the time the water was drawn from it by the nine pipes from which it took its later name. Two temples were above it, according to Pausanias, one dedicated to Demeter and Proserpine, and the other to Triptolemus. The fountain in the temple of Erechtheus at Athens was supplied by a spring of salt water, and a similar spring supplied that in the temple of Poseidon Hippias at Mantinea.

The water-supply of Rome and the works auxiliary to it were on a scale to be expected from a people of such great practical power. The remains of the aqueducts which stretched from the city across the Campagna are among the most striking monuments of Italy. Vitruvius (book viii.) gives minute particulars concerning the methods to be employed for the discovery, testing, and distribution of water, and describes the prop-



erties of different waters with great care, proving the importance which was attached to these matters by the Romans. The aqueducts supplied the baths and the public fountains, from which last all the populace, except such as could afford to pay for a separate pipe to their houses, obtained their water. These fountains were therefore of large size and numerous. They were formed at many of the *castella* of the aqueducts (see *AQUEDUCT*). According to Vitruvius, each *castellum* should have three pipes — one for public fountains, one for baths, and the third for private houses. Considerable revenue was drawn from the possessors of private water-pipes. The Roman fountains were generally decorated with figures and heads. Fountains were often also the ornament of Roman villas and country houses; in those so situated the water generally fell from above into a large marble basin, with at times a second fall into a still lower receptacle.

To the remains of Pompeii we are indebted for much exact knowledge of Roman antiquity in its minutest particulars; and not the least interesting of the disinterred forms are those of the public and private fountains which the city possessed. The two adjacent houses in Pompeii had very remarkable fountains. One, says Gell, "is covered with a sort of mosaic consisting of vitrified tesserae of different colors, but in which blue predominates. These are sometimes arranged in not inelegant patterns, and the grand divisions as well as the borders are entirely formed and ornamented with real sea-shells, neither calcined by the heat of the eruption nor changed by the lapse of so many centuries" (*Pompeiana*, i. 196). Another of large size was similarly decorated with marine shells, and is supposed to have borne two sculptured figures, one of which, a bronze, is said to be in the museum at Naples. This fountain projects five feet seven inches from the wall against which it is placed, and is seven feet wide in front, while the height of the structure up to the eaves of the pediment is seven feet seven inches. On a central column in the piscina was a statue of Cupid, with a dove, from the mouth of which water issued. Cicero had, at his villa at Formiæ, a fountain which was decorated with marine shells.

Fountains were very common in the open spaces and at crossways in Pompeii. They were supplied by leading pipes from the reservoirs, and had little ornament except a human or animal head, from the mouth of which it was arranged that the water should issue. Not only did simple running fountains exist, but the remains of *jets d'eau* have been found; and a drawing exists representing a vase with a double jet of water, standing on a pedestal placed in what is supposed to have been the impluvium of a house. There was also a *jet d'eau* at the eastern end of the peristyle of the Fullonica at Pompeii.

As among the Greeks, so with the early Celts, traces of superstitious beliefs and usages with relation to fountains can be traced in monumental and legendary remains. Near the village of Primaleon in Brittany was a very remarkable monument, — one possibly unique, as giving distinct proof of the existence of an ancient cult of fountains. Here, according to Freminville, is a dolmen composed of a horizontal table supported by two stones only, one at each end. All the space beneath this altar is occupied by a long square basin formed of large flat stones, which receives a fountain of water. At Lochrist is another vestige of the Celtic cult of fountains.

The public drinking fountains in towns and villages are now very common and quite secular objects. In the East they are a very important institution. In Cairo alone there are 300. These "sebeels" are not only to be seen in the cities, but are plentiful in the

fields and villages, and the great number of them endowed for the gratuitous supply of water to the passengers is referred to by Lane as proving the possession by the Egyptians of a benevolent and charitable character.

Purely ornamental fountains and jets d'eau are found in or near many large cities and private seats.

**FOUNTAINS ABBEY.** This abbey deserves notice as the largest and best preserved of the Cistercian houses in England. It was founded in 1132, and is situated on the north bank of the river Skell, in Yorkshire.

**FOUQUÉ, FRIEDRICH HEINRICH KARL, BARON DE LA MOTTE**, one of the most industrious and popular of German authors in the early part of this century, was born February 12, 1777, at Brandenburg on the Havel. An only child, he was educated at home by a succession of tutors, one of whom, the author August Hülse, did much to encourage the boy's literary tastes. The somewhat monotonous home life, also, was relieved by holidays spent with relations in a romantic old castle near Halle, and by brilliant visits to Potsdam, whence he came with his little head turned by glimpses of the revered king, by blasts of military music and the tramp of soldiers. When the French Revolution broke out, the young Fouqué eagerly espoused the cause of the royal family. He became discontented with the prospect of studying law at the university of Halle, and in 1794 entered the army as *übercompleter cornet* in the grand-duke of Weimar's cuirassier regiment, then in the field. At the age of nineteen he served in the unfortunate campaign of the Rhine; and for several years afterward he led a half military, half literary life with his regiment, whose headquarters were first at Aschersleben and then at Bückeburg.

Fouqué married very early in life; but the union was an unhappy one, and ended in divorce. In 1802, when still only twenty-five, he married his second wife, the widowed Frau von Rochow, better known as Caroline, Baroness de la Motte Fouqué, herself an authoress of some note; and, having obtained his discharge from military service, he retired to his wife's family estate of Nennhausen, near Rathenau, devoting himself to the study of Italian and Spanish, and to bringing out his first work *Dramatische Spiele*, under the feigned name of Pellegrin (1804). The volume was published by the brothers Schlegel, and their names were enough to win popularity for what Fouqué himself afterward called a "Schülerwerk."

In February, 1813, he had rejoined the army as lieutenant of cavalry, and twice narrowly escaped with his life at the battle of Lützen. After the battle, while he was carrying an important dispatch over country at night, his horse stumbled into deep water; and this misadventure resulted in an illness which disabled him for further service. He received an honorable discharge, was presented with the decoration of the "Johanniterorden," and promoted to the rank of major of cavalry. The invalid soldier now returned to his wife and daughter at Nennhausen, and again took up his pen. His wife died in 1831; and, having removed to Halle, he married there for the third time. He delivered lectures in Halle on the history of poetry and other forms of literature, and had gone to Berlin with the purpose of lecturing there also, when he died suddenly, January 23, 1843, aged sixty-six.

Fouqué's popularity was great; but he had the misfortune to outlive it. A disciple of the brothers Schlegel and the Romance School in Germany, he became one of its most illustrious representatives. There was a time when Fouqué's volumes were in every German household, and people waited eagerly at the libraries for his newest work. But he lived to see the change in



literary taste which shelved the romance school, and with it almost all his own writings. The greater part of these are being now quickly forgotten. Those which have survived, and will survive, the variations of popular taste, are his romances—the *Zauberring* and the contents of the *Jahreszeiten*, especially the exquisite *Undine*, which has always been considered his masterpiece.

FOUQUET, NICOLAS, viscount of Melun and of Vaux, marquis of Belle-Isle, superintendent of finance under Louis XIV., was born at Paris in 1615. Destined to official life, he was carefully educated; and so evident was his superior ability that he was appointed master of requests at the age of twenty. He was only thirty-five when he obtained the important post of *procureur-général* to the parliament of Paris (1650). During the civil war Fouquet devoted himself to the interests of the queen-mother, Anne of Austria, and enjoyed in return her protection and patronage. At her instance he was called in 1652 to the office of superintendent of finance. He had long been in the confidence of the first minister, Cardinal Mazarin, and was his zealous instrument. But soon after the marriage of Louis XIV. a quarrel broke out between them, and thenceforth each was bent on injuring the other. The increasing deficit in the treasury alarmed the king; inquiries were addressed to Colbert, who was secretly ambitious of succeeding Fouquet as minister of finance, and he consequently made the worst of the case against Fouquet. The extravagant expenditure and personal display of the superintendent served to intensify the ill-will of the king. Fouquet had bought the port of Belle-Isle, and strengthened its fortifications, with a view to taking refuge there in case of disgrace. He had spent enormous sums in building a palace on his estate of Vaux, which in its extent, magnificence, and splendor of decoration, was almost a forecast of Versailles. He had cherished the hope of succeeding Mazarin as first minister, and had even made advances to Mademoiselle de la Vallière. In August, 1661, he entertained the king at his palace of Vaux, giving him a fête unrivaled for magnificence, at which *Les Fâcheux* of Molière was for the first time produced. But the king could not be appeased. By crafty devices Fouquet had been induced to sell his office of *procureur-général*, thus losing the protection of its privileges, and he had paid the price of it into the treasury. The king, however, was only prevented from arresting him at the fête by the pleading of the queen mother. He dissembled for a short time, and the arrest was made about three weeks later at Nantes. Fouquet, after several removals from prison to prison, was sent to the Bastille. His trial extended over several years, and excited the deepest interest. In 1664 he was condemned and sentenced to perpetual exile and confiscation of his property. The sentence, however, was commuted into one of imprisonment for life in the fortress of Pignerol. He bore his fate with manly fortitude, and composed in prison several devotional works. He died at Pignerol, March 23, 1680.

FOUQUIER-TINVILLE, ANTOINE QUENTIN, was born at Hérouel, a village in the department of the Aisne. Originally a *procureur* (attorney) attached to the châtelet jurisdiction at Paris, he is said to have been driven by his debts to accept a humble employment under the lieutenant-général de police. When the Revolution broke out he was, as the friend of Danton and Robespierre, appointed public prosecutor to the revolutionary tribunal of Paris, and discharged this office with the most unimpassioned rigor from March 10, 1793, to July 28, 1794. He dealt as pitilessly with his friends as with his enemies, if only they

were charged by the committee of public safety. He sent to the guillotine his protector Danton, just as he had sent Vergniaud and the Girondists. He was not an eloquent speaker, but maintained his accusations with an obstinacy so cold, convincing and pressing that he never failed to obtain from the judges the sentence of capital punishment, which he always claimed. Although it seems that he had been somewhat unscrupulous in the earlier part of his career, he was, during the period of his bloody mission, inaccessible to bribery; and, having accepted it as his business to provide the guillotine with a constant supply of victims, he might well boast of faithfulness in its discharge. And this he actually did in the pamphlet that he published in his own defense, when he had been imprisoned by order of the convention (August 1, 1794), on the motion of Fréron, whose hands had been as deeply imbrued in blood as those of Fouquier. But the men then in power wielded the terrors of the law in a spirit of revenge that made them as unsparing as Robespierre and his companions had been. After a trial which lasted forty-one days, Fouquier-Tinville was in his turn sent to the scaffold, on May 8, 1795.

FOURCHAMBAULT, a town of France in the department of Nièvre, on the right bank of the Loire, with a station on the railway about five miles southeast of Nevers.

FOURCROY, ANTOINE FRANÇOIS, COMTE DE, a celebrated chemist, son of an apothecary in the household of the duke of Orleans, was born at Paris, June 15, 1755. In 1777, under the auspices of the Société Royale de Médecine, appeared Fourcroy's first publication, *Essai sur les Maladies des Artisans*, the translation of a Latin work by Ramazzini, with notes and additions. At length Fourcroy, who was recognized as the most successful alumnus of the Parisian medical school, became an applicant for a gratuitous degree and license, provision for the granting of which to the best deserving poor student had been made by the bequest of a Doctor Diest. Together with Berthollet, Fourcroy was associated with Lavoisier and Guyton de Morveau in 1786 and 1787 in the preparation of a work entitled *Méthode de Nomenclature Chimique*, published in the latter year. In 1785 a memoir on the tendons, subsequently completed in six parts, gained for him admission into the French Academy of Sciences. He became in 1792 one of the deputies of the National Convention, and, in 1793, a member of the Assembly, and soon proved himself one of the most active of the committee for the public instruction. To him was due the enlargement of the Jardin des Plantes, and the formation of a commission for the preservation of works of art. He further was the means of releasing from imprisonment Desault, surgeon of the Hôtel-Dieu, and of preventing the execution of Darcet, though, unfortunately for science, he found no opportunity of rescuing Lavoisier. On the 9th of Thermidor he was appointed a member of the committee for the public safety, and in this capacity he instituted three schools of medicine, assisted in the organization of the Ecole Polytechnique (at that time the Ecole des Travaux Publiques), and was concerned also in the establishment of the Ecole Normale, the Institut, and the Musée d'Histoire Naturelle. After the revolution of November 9, 1799, he was made a councilor of state; and, being appointed director-general of instruction, he, in the course of five years, superintended the formation of twelve schools of law, over thirty lyceums, afterward called royal colleges, and 300 elementary schools. His incessant labors at length told on his health, and he suffered greatly from palpitation of the heart. On December 16, 1809, the very day on which, by letters patent, he had been created a count



of the French empire, with a yearly pension of 20,000 francs, he was signing some dispatches, when he suddenly exclaimed, "Je suis mort," and, with those words, expired.

FOURIER, FRANÇOIS CHARLES MARIE, one of the most celebrated socialist writers, was born at Besançon in Franche-Comté, on April 7, 1772.

During the early part of his life, and while engaged in commerce, he had become deeply impressed with the conviction that social arrangements resulting from the principles of individualism and competition were essentially imperfect and immoral. He proposed to substitute for these principles co-operation or united effort, by means of which full and harmonious development might be given to human nature. The scheme, worked out in detail in his first work, *Théorie des Quatre Mouvements*, has for foundation a particular psychological proposition and a special economical doctrine. Psychologically Fourier held what may with some laxity of language be called natural optimism,—the view that the full, free development of human nature or the unrestrained indulgence of human passion is the only possible way to happiness and virtue, and that misery and vice spring from the unnatural restraints imposed by society on the gratification of desire. This principle of harmony among the passions he regarded as his grandest discovery—a discovery which did more than set him on a level with Newton, the discoverer of the principle of attraction or harmony among material bodies. Throughout his works, in uncouth, obscure, and often unintelligible language, he endeavors to show that the same fundamental fact of harmony is to be found in the four great departments,—society, animal life, organic life, and the material universe. In order to give effect to this principle and obtain the resulting social harmony, it was needful that society should be reconstructed; for, as the social organism is at present constituted, innumerable restrictions are imposed upon the free development of human desire. As practical principle for such a reconstruction Fourier advocated coöperative or united industry. In many respects what he says of coöperation, in particular as to the enormous waste of economic force which the actual arrangements of society entail, still deserves attention, and some of the most recent efforts toward extension of the coöperative method, *e. g.*, to house-keeping, were in essentials anticipated by him. But the full realization of his scheme demanded much more than the mere admission that coöperation is economically more efficacious than individualism. Society as a whole must be organized on the lines requisite to give full scope to coöperation and to the harmonious evolution of human nature. The details of this reorganization of the social structure cannot be given briefly, but the broad outlines may be thus sketched. Society, on his scheme, is to be divided into departments or *phalanges*, each *phalange* numbering about 1,600 persons. Each *phalange* inhabits a *phalanstère* or common building, and has a certain portion of soil allotted to it for cultivation. The *phalanstères* are built after a uniform plan, and the domestic arrangements are laid down very elaborately. The staple industry of the *phalanges* is, of course, agriculture, but the various *series* and *groupes* into which the members are divided may devote themselves to such occupations as are most to their taste; nor need any occupation become irksome from constant devotion to it. Any member of the group may vary his employment at pleasure, may pass from one task to another. The tasks regarded as menial or degrading in ordinary society can be rendered attractive if advantage is taken of the proper principles of human nature; thus children,

who have a natural affinity for dirt, and a fondness for "cleaning up," may easily be induced to accept with eagerness the functions of public scavengers. It is not, on Fourier's scheme, necessary that private property should be abolished, nor is the privacy of family life impossible within the *phalanstère*. Each family may have separate apartments, and there may be richer and poorer members. But the rich and poor are to be locally intermingled, in order that the broad distinction between them, which is so painful a feature in actual society, may become almost imperceptible. Out of the common gain of the *phalange* a certain portion is deducted to furnish to each member the minimum of subsistence; the remainder is distributed in shares to labor, capital, and talent—five-twelfths going to the first, four-twelfths to the second, and three-twelfths to the third. Upon the changes requisite in the private life of the members Fourier was in his first work more explicit than in his later writings. The institution of marriage, which imposes unnatural bonds on human passion, is of necessity abolished; a new and ingeniously constructed system of license is substituted for it. Considerable offense seems to have been given by Fourier's utterances with regard to marriage, and generally the later advocates of his views are content to pass the matter over in silence, or to veil their teaching under obscure and metaphorical language.

Fourier did not live to see the success of his newspaper, and the only practical attempt during his lifetime to establish a *phalanstère* was a complete failure. In 1832, M. Baudet Dulary, deputy for Seine-et-Oise, who had become a convert, purchased an estate at Condé sur Vesgre, near the forest of Rambouillet, and proceeded to establish a socialist community. The capital supplied was, however, inadequate, and the community broke up in disgust. Fourier was in no way discouraged by this failure, and till his death, in October, 1837, lived in daily expectation that wealthy capitalists would see the merits of his scheme, and be induced to devote their fortunes to its realization. It may be added that subsequent attempts to establish the *phalanstère* have been uniformly unsuccessful.

FOURIER, JEAN BAPTISTE JOSEPH, French mathematician, was born at Auxerre, March 21, 1768. He was the son of a tailor, and was left an orphan in his eighth year; but through the kindness of a friend, who observed in him the promise of superior abilities, admission was gained for him into the military school of his native town, which was then under the direction of the Benedictines of Saint-Maur. He soon distinguished himself as a student, and made rapid progress, delighting most of all, but not exclusively, in mathematics. It was his wish to enter the artillery or engineer corps, but failing in this, he was appointed professor of mathematics in the school in which he had been a pupil. This post he held for about four years (1789–1794), and during this time he was frequently called to lecture on other subjects, rhetoric, philosophy, and history. On the institution of the normal school at Paris he was sent to teach in it, and was afterward attached to the polytechnic school. Fourier was one of the savants who accompanied Bonaparte to Egypt in 1798; and during this expedition he was called to discharge important political duties in addition to his scientific ones. He was for a time virtually governor of half of Egypt, was for three years secretary of the institute of Cairo, and undertook to deliver the funeral orations for Kléber and Desaix. On his return to France he was nominated prefect of Grenoble, and was created baron and chevalier of the Legion of Honor. He took an important part in the preparation of the famous *Description de l'Égypte*, and wrote the historical introduction. He



held his prefecture for fourteen years; and it was during this period that he carried on his elaborate and fruitful investigations on the propagation of heat in solid bodies. His first memoir on the mathematical theory of heat was crowned by the Academy. On the return of Napoleon I. from Elba in 1815, Fourier published a royalist proclamation, and left Grenoble as Napoleon entered it. He was then deprived of his prefecture, and, although immediately named prefect of the Rhône, was soon after again deprived. He now settled at Paris, was elected to the Academy of Sciences in 1816, but in consequence of the opposition of Louis XVIII. was not admitted till the following year, and was afterward made perpetual secretary in conjunction with Cuvier. In 1822 he published his most celebrated work, entitled *La Théorie Analytique de la Chaleur*, which, by its new methods and great results, made an epoch in the history of mathematical and physical science. Of this work M. Cousin said that the grandeur of its results was no more to be questioned than their certainty, and that in the opinion of scientific Europe the novelty of the analysis on which they rest is as evident as its completeness. In 1827 Fourier was received at the French Academy, and the same year succeeded Laplace as president of the council of the polytechnic school. In 1828 he became a member of the Government commission established for the encouragement of literature. He died at Paris, May 16, 1830.

FOURMONT, ÉTIENNE, a French Orientalist, was born at Habelai, near Saint Denis, in 1683. He studied in Mazarin College, and afterward in the seminary of Trente-trois. Here his attention was attracted to Oriental languages, and shortly after leaving the seminary he published a *Traduction du Commentaire du Rabbin Abraham Aben Esra sur l'Ecclésiaste*. He became professor of Arabic in the Royal College in 1715. In 1713 he was elected a member of the Academy of Inscriptions, in 1738 a member of the Royal Society of London, and in 1741 a member of that of Berlin. He died at Paris in December, 1745.

FOURNIER, PIERRE SIMON, French engraver and typesetter, was born at Paris, September 15, 1712. In 1737 he published his *Table des Proportions qu'il faut observer entre les Caractères*, which was followed by several other technical treatises. In 1758 he assailed the title of Guttenberg to the honor awarded him as inventor of printing, claiming it for Schöffer, in his *Dissertation sur l'Origine et les Progrès de l'Art de graver en Bois*. This gave rise to a controversy in which Schopflin and Baer were his opponents. Fournier's contributions to this debate were collected and reprinted under the title of *Traité historique et critique sur l'Origine de l'Imprimerie*. His principal work, however, was the *Mannet Typographique*, which appeared in two vols. 8vo in 1764, the first volume treating of engraving and type-founding, the second of printing, with examples of different alphabets. It was the author's design to complete the work in four volumes, but he did not live to execute it. He died at Paris, October 8, 1768.

FOWL, originally used in the sense that Bird now is, but, except in composition, as Sea-Fowl, Wild-Fowl, and the like — practically almost confined at present to designate the otherwise nameless species which struts on our dunghills, gathers round our barn-doors, or stocks our poultry-yards — the type of the genus *Gallus* of ornithologists, of which four well-marked species are known. The first of these is the Red Jungle-Fowl of the greater part of India, *G. ferrugineus*, called by many writers *G. bankiva* — which is undoubtedly the parent stock of all the domestic races. It inhabits Northern India from Sindh to Burmah and Cochin

China, as well as the Malay Peninsula and many of the islands as far as Timor, besides the Philippines. It occurs on the Himalayas up to the height of 4,000 feet, and its southern limits in the west of India proper are, according to Jerdon, found on the Raj-peepla hills to the south of the Nerbudda, and in the east near the left bank of the Godavery, or perhaps even further, as he had heard of its being killed at Cummum. This species greatly resembles in plumage what is commonly known among poultry-fanciers as the "Black-breasted Game" breed, and this is said to be especially the case with examples from the Malay countries, between which and examples from India some differences are observable — the latter having the plumage less red, the ear-lappets almost invariably white, and slate-colored legs, while in the former the ear-lappets are crimson, like the comb and wattles, and the legs yellowish. The second good species is the Gray Jungle-Fowl, *G. sonnerati*, whose range begins a little to the northward of the limits of the preceding, and it occupies the southern part of the Indian peninsula, without being found elsewhere. The cock has the shaft of the neck-hackles dilated, forming a horny plate, the terminal portion of which is like a drop of yellow sealing-wax. His call is said to be very peculiar, being a broken and imperfect kind of crow, quite unlike that of *G. ferrugineus*, and impossible, says Jerdon, to describe. The third species is the Cingalese Jungle-Fowl, *G. stanleyi*, peculiar to Ceylon. This also greatly resembles in plumage some domestic birds, but the cock is red beneath, and has a yellow comb with a red edge, and purplish-red cheeks and wattles. He has also a singularly different voice, his crow being dissyllabic. This bird crosses readily with tame hens, but the hybrids are believed to be infertile. The fourth species, *G. varinus*, inhabits Java and the islands eastward as far as Flores. This differs remarkably from the others in not possessing hackles, and in having a large unserrated comb of red and blue, and only a single chin wattle. The predominance of green in its plumage is another easy mark of distinction. Hybrids between these species and domestic birds are often produced, but they are most commonly sterile.

Several circumstances seem to render it likely that fowls were first domesticated in Burmah or the countries adjacent thereto, and it is the tradition of the Chinese that they received their poultry from the West about the year 1400 B.C. By the Institutes of Manu, the date of which is variously assigned from 1200 to 800 B.C., the tame fowl is forbidden, though the wild is allowed to be eaten — showing that its domestication was accomplished when they were written. See POULTRY.

FOWLER, CHARLES, architect, was born at Col-lumpton, Eng., May 17, 1792. After serving an apprenticeship of five years at Exeter, he went to London in 1814, and entered the office of David Laing, where he remained till he commenced practice for himself. His first work of importance was the Court of Bankruptcy in Basinghall street, finished in 1821. For some years he was honorary secretary of the institute of British architects, and he was afterward created vice-president. He retired from his profession in 1853, and died at Great Marlow, Bucks, September 26, 1867.

FOWLER, JOHN, inventor of the steam plow, was born at Melksham, Eng., July 11, 1726. He learned practical engineering at Middlesborough-on-Tees, and in 1849 invented a machine for laying drain-tiles, which was at first worked by horses but afterward by steam. In 1852 he began experiments in steam cultivation, and at the Chester meeting in 1858 he received for his steam plow the Royal Agricultural Society's prize. He died December 4, 1864.



FOWLER, WILLIAM, one of the poets who frequented the court of James VI. before his accession to the throne of England, was born about the year 1560. After attending St. Leonard's College, St. Andrews, between 1573-74 and 1578, he seems to have selected the legal profession, and in 1580, when about twenty years of age, he was at Paris studying the civil law. He subsequently became private secretary and master of requests to Anne of Denmark, and died in 1614.

FOWNE, GEORGE, Ph.D., F.R.S., an eminent chemist, was born in London, in 1815. He early showed an interest in scientific pursuits, and when seventeen or eighteen years of age joined with Dr. Henry Watts and Mr. Everett in establishing a philosophical class at the Western Literary Institution at Leicester square. In 1837 he entered the laboratory of Everett, lecturer on chemistry at the Middlesex hospital; and in 1839 he studied for some time under Professor Liebig, at Giessen. He was lecturer on chemistry first at the Charing Cross and then at the Middlesex hospital medical school, as also at the school of the Pharmaceutical Society. In 1845 he was appointed director of the Birkbeck chemical laboratory in University college, London. He died of consumption, January 31, 1849.

FOX, a genus of digitigrade Carnivora, belonging to the *Canidae* or dog family, but differing from the true dogs (*Canis*) in the greater elongation and sharpness of the muzzle, and in the greater length and bushiness of the tail. They likewise differ in the pupil of the eye being elliptical when contracted, and in the possession of a subcaudal gland, in which a fetid substance is secreted, the emission of which gives to foxes their peculiarly disagreeable odor. There are twenty-four recent species of foxes known, distributed over all the great continents except South America and Australia. Of these the Fennec foxes are exclusively African, and the bristle-tailed foxes North American. The Common Fox (*Vulpes vulgaris*), the pet of the hunting field and the pest of the farmyard, occurs throughout Europe, wherever it has not been exterminated by man. It is the Scottish *tod* and the French *renard*. It measures about two feet in length exclusive of the tail, which is about a foot long. Its fur is of a reddish-brown color above, and more or less white beneath; the back of its ears and the forepart of its limbs are black, and the tip of its bushy tail, or brush as it is called, is white. Its long, sharp muzzle, erect pointed ears, and sharp eye give it an appearance of sagacity and cunning which its real character fully justifies. The fox is a solitary animal, inhabiting a burrow known as its earth, which it either excavates for itself, or, as more usually happens, obtains by previously ejecting the badger or the rabbit from its home. So averse, indeed, is the fox to dig for itself, that when foiled in its attempts to dispossess the badger, it has been known to take up its quarters with the latter, and in Germany it is readily induced to make its home in artificial burrows, constructed of stone and earth for the purpose of facilitating the operation of digging out the cubs. The fox also occurs in woods, and even in the open country without burrows, lying in its "cover" by day and stealing forth at night, when alone it can be said to see properly, in search of its prey. Its food consists of rabbits, hares, poultry and game-birds, although when these are not to be had it is fain to satisfy its hunger with rats, mice, and even insects—"the droppings of these creatures," says Bell, "being often composed almost entirely of beetle wings."

Closely allied to the common fox of Europe is the Red Fox (*Vulpes fulvus*) of eastern North America, regarded by many naturalists as only a variety of the common species—an opinion which receives some confirmation from the fact that hitherto no remains of the

red fox have been found in the cave deposits of that continent, although remains of the gray fox are abundant. It may thus possibly be the descendant of individuals of the European species, introduced at a comparatively early period, and owing the differences that now distinguish it to the greatly altered conditions under which for centuries it has existed.

FOX, CHARLES JAMES, born on January 24, 1749, at 9 Conduit street, in the city of Westminster, was the third son of Henry Fox, first Lord Holland. His mother was the eldest daughter of the second duke of Richmond. As his great-great-grandmother was duchess of Portsmouth, he had in his veins the blood of Charles II. of England and Henry IV. of France. His paternal grandfather, Sir Stephen Fox, was born shortly after Charles I. ascended the throne, and died shortly after the accession of George I. The public services of this member of the Fox family have received less notice than they deserve. He was a yeoman's son who, having been taught to read, write, and cipher, was considered capable of rising in the world. When a youth he first obtained a situation in the household of the earl of Northumberland; then he entered the service of Lord Percy, the earl's brother, and he was present with the royalist army at the battle of Worcester as Lord Percy's deputy at the ordnance board. Accompanying Charles II. in his flight to the Continent, he served him in a menial capacity during his exile, till he was promoted to be keeper of the privy purse. He was employed as intermediary between the king and General Monk. Honors and emoluments were his reward after the Restoration; he was knighted, and appointed to the lucrative offices of clerk of the green cloth and paymaster of the forces. He entered the House of Commons, first as member for Salisbury, and secondly for Westminster. He succeeded the earl of Rochester as a commissioner of the treasury, filling that office for twenty-three years and during three reigns. At the mature age of seventy-seven he married for the second time; four children were the issue of this marriage. He died in 1716 at the age of eighty-nine, and left a large fortune.

Henry Fox's affection for his son Charles James verged on idolatry. The boy was both precocious and engaging. Whatever he chose to learn, he acquired with ease, and he displayed more than a boy's good sense in correcting his faults. Once he overheard his mother, with whom he was no favorite, remark to his father, "Charles is dreadfully passionate; what shall we do with him?" and the reply, "Oh, never mind; he is a very sensible little fellow, and he will learn to cure himself." Thereupon he resolved to repress his angry passions, and he succeeded in rendering himself a pattern for gentle bearing and command of temper. He went to Eton when he was nine, having spent the preceding year, at his own request, in the school kept at Wandsworth by Pampelonne, a French refugee. The boy's health was delicate, and this caused his father much anxiety. He was not diligent in learning, nor was his tendency toward indolence at school counteracted by the discipline to which he was subjected. Leaving Eton in 1764, Fox went to Oxford, where he entered Hertford College. In a letter to his friend Mr. Macartney, he professed a great liking for Oxford and fondness for mathematics, adding, in another letter, that he believed mathematics were useful, and was sure they were entertaining, this being enough, in his opinion, to recommend them. Taking his degree in 1766, he left Oxford and spent the succeeding two years in Continental travel, traversing France and Italy, either in company with his parents, or else with his friends Lord Carlisle, Lord Fitzwilliam and Mr. Uvedale Price. Along with Mr. Price he visited Voltaire at Ferney, where he was



heartily welcomed by the great Frenchman for his father's sake, and was advised to read Voltaire's published works in order that he might emancipate himself from religious prejudices and increase his stock of ideas. He became a proficient in speaking the French tongue, and he practiced himself in writing it by penning poetical epistles in French to his friend Fitzpatrick.

In 1768, when still under age, Fox was returned for Midhurst, then a pocket borough. His father having made the arrangements necessary for his election had thereby provided a supporter of the ministry of the day which the earl of Chatham had formed, and in which the duke of Grafton was first lord of the treasury. Fox's maiden speech in the House of Commons was delivered in defense of the ministry and in opposition to seating John Wilkes as member for Middlesex. He at once made his mark as a parliamentary speaker, recalling to some members the best traits of Charles Townshend and the elder Pitt. Fox had his reward by being appointed a lord of the admiralty immediately after attaining his majority, and when Lord North had succeeded the duke of Grafton as prime minister. Two years afterward he resigned, on account of a misunderstanding with his chief and a determination to oppose the Royal Marriage Bill, which the ministry introduced out of deference to George III., and about which the king wrote to Lord North:—"I do expect every nerve to be strained to carry the Bill through both the Houses with a becoming firmness, for it is not a question that immediately relates to administration, but personally to myself; therefore I have a right to expect a hearty support from every one in my service, and shall remember defaulters." Fox not only opposed the bill, which was framed to discourage members of the royal family from marrying, and to throw artificial obstacles in their way should they desire to make love matches, but he also introduced a bill to amend Lord Hardwicke's Act, "For the better preventing of Clandestine Marriages," which his father had virulently opposed. This conduct, which gave great offense to George III., was the origin of that implacable enmity to his great subject which ever after prevailed in the royal breast, to the detriment alike of the throne and the country. In introducing his bill Fox was said by Horace Walpole to have spoken "with ease, grace, and clearness;" he effectively answered Edmund Burke and Lord North who opposed it, ridiculing the arguments of the former and confuting those of the latter, "with a shrewdness that, from its multiplicity of reasons, as much exceeded his father in embracing all the argument of his antagonists as he did in his manner and delivery." This was doubly agreeable to his father, who had formed a clandestine marriage, and who thought such an Act as Lord Hardwicke's a slur upon himself. The attempt of his son failed, though he had the triumph of beating the ministry by a majority of one on a motion for leave to introduce the bill. After being a year out of office, he became reconciled to Lord North, and re-entered the administration as a junior lord of the treasury. But he soon reasserted his independence, differing from Lord North on a question of procedure, and causing the defeat of the ministry in the House of Commons by pressing an unwelcome motion to a division. The king was incensed at what he styled Charles Fox's presumption, adding, in a letter to the premier, "Indeed, that young man has so thoroughly cast off every principle of common honor and honesty that he must become as contemptible as he is odious; and I hope you will let him know you are not insensible of his conduct toward you." Lord North, acting in conformity with the king's suggestion, wrote as follows to Fox:—"Sir, his Majesty has thought proper to order a new commission of the treasury to be made out,

in which I do not see your name." Thus ended the first stage of Fox's political career. A year later he avowed in the House of Commons that "the greatest folly of his life was in having supported Lord North."

In 1774, Fox began that opposition to the ill-advised and ill-fated measures of Lord North which gave him a place among the greatest of orators and the most prescient of statesmen. Soon after Fox entered the ranks of the Opposition he became its acknowledged chief. This rapid advancement was largely due to the lessons in practical politics taught him by Edmund Burke, whose acquaintance he had made in early life. The story of his career from 1774, when he left Lord North's administration, to 1782, when Lord North resigned and when he became secretary of state in the second Rockingham administration, is associated with the unsparing and brilliant opposition of the Whig party to the war which ended with the ratification of the independence of the Thirteen United Colonies of America. An important episode during that period was his election as the member for the city of Westminster. On February 2, 1780, a meeting in favor of parliamentary reform was held in Westminster Hall, at which such leading members of the Whig party were present as the duke of Portland, Earl Temple, John Wilkes, General Burgoyne, Alderman Sawbridge, Edmund Burke, and over which Fox presided. He delivered a stirring speech in favor of a redress of grievances, and in particular of a reform in the representation of the people. After it had been resolved that a petition to that effect should be presented to parliament, it was proposed and carried by acclamation that Fox, "the Man of the People," should become a candidate to represent Westminster in the House of Commons, and before the year closed he was a member for the constituency which he represented till the end of his life. A little more than a century had then elapsed since Sir Stephen Fox, his grandfather, had been first returned for the city of Westminster. George III. encouraged the opposition to the election of the "Man of the People," of whom he wrote that "Fox never had any principle, and can therefore act as his interest may guide him." Eight thousand pounds were contributed out of the civil list to promote the success of Lord Lincoln, the favorite of the court, yet neither corrupt expenditure nor royal disapproval sufficed to hinder the triumph of Fox. As secretary of state in the ministry of the Marquis of Rockingham, and leader of the House of Commons, Fox displayed great business aptitude and capacity for conciliation. A short time before he became minister, Horace Walpole wrote to Sir Horace Mann:—"Mr. Fox is the first figure in all the places I have mentioned—the hero in parliament, at the gaming-table, at Newmarket." After he became minister, the same writer informed his correspondent—"Mr. Fox already shines as greatly in place as he did in opposition, though infinitely more difficult a task. He is now as indefatigable as he was idle. He has perfect temper, and not only good humor but good nature, and, which is the first quality of a prime minister in a free country, has more common sense than any man, with amazing parts that are neither ostentatious nor affected." His experience of high office was very short. Lord Rockingham became premier on March 27, 1782; he died on the first of the following July, and Fox resigned immediately afterward. He had finally resolved to do so before the death of his chief, having been outvoted in the cabinet on the question of unconditionally acknowledging the independence of the United Colonies. His brother secretary of state, the earl of Shelburne, and other colleagues thought that the concession of independence should be made one of the conditions



of peace. Fox regarded Shelburne with undisguised aversion. When the administration was formed, he fancied that Shelburne was disposed to imitate Lord North and to pay undue deference to George III., and he told him that it appeared "the administration was to consist of two parts, one belonging to the king, the other to the public." Four weeks after being in office Fox wrote to his friend Fitzpatrick:—"Shelburne shows himself more and more every day, is ridiculously jealous of my encroaching on his department, and wishes very much to encroach upon mine." Shelburne, in turn, suspected Fox of designs to monopolize power, and to have his own way in all things. This unfortunate antagonism between two men of remarkable ability caused a split in the Whig party, and enabled the king to succeed in his policy of intrusting power only to ministers who were subservient to his will. Succeeding Lord Rockingham as premier, Shelburne held office till February 24, 1783. The coalition ministry, in which the duke of Portland was premier, and Lord North and Fox were secretaries of state, took the place of that over which Shelburne had presided. It was with extreme and undisguised reluctance that the king permitted this administration to be formed. When he found it hopeless to struggle against the inevitable result, he communicated his real feelings on the subject to those politicians who prided themselves upon being his friends. In conversation with Mr. Wyndham Grenville, he poured out his indignation "upon Fox, whom he loaded with every expression of abhorrence; upon the duke of Portland, against whom he was little less violent; upon Lord North, to whose conduct he imputed all the disasters of the country; upon American independence, which seemed to have been a most bitter pill indeed." His early detestation of Fox had now been intensified, owing to the unnatural behavior of his eldest son, which he erroneously attributed to the teaching of the great Whig statesman. The king even consulted Lord Chancellor Thurlow and Lord Ashburton as to "what redress he could have against a man who alienated from him the affections of his son," and it is said that Thurlow told him "he would have no peace till his son and Fox were secured in the Tower." One of the first acts of the coalition was to arrange about the establishment and income of the Prince of Wales. The king was shocked at the proposition which the ministry laid before him, considering the sum which had been agreed upon as a fitting one for the prince to receive utterly extravagant; and he alleged that his advisers were ready to sacrifice the public interests to gratify an "ill-advised young man." In consequence of the king's disapproval of the scheme, his eldest son had to content himself with an allowance which was wholly inadequate; hence he had to make repeated applications to parliament to pay his debts. While the coalition ministry held office the definitive treaties of peace were signed between Great Britain and France, Spain and the United States of America, and thus a war which a ministry after George III.'s own heart had provoked and carried on with amazing incompetence ceased to impoverish and humiliate the nation. But the chief act of the administration and the cause of its downfall was the introduction of a bill for the just and efficient government of British India. Though Burke had the principal share in planning the measure, yet Fox, having made himself thoroughly master of the questions at issue, expounded the scheme in the House of Commons with great lucidity and impressiveness. The opposition to it was vehement and disingenuous; the measure was falsely described as having been solely designed in order to confiscate the property of the East India

Company and establish the supremacy of the Whig party. William Pitt, who was then unsparing and unfair in his criticism, afterward did practical justice to the wisdom of Fox and his colleagues by bringing a measure into parliament resembling that of the coalition ministry in many essential particulars. Fox's prediction was thus verified, for the day arrived when his statesmanlike and much-maligned bill was "regarded in its true light as a strong, but as a necessary and a just measure." But the king had determined that the bill which Fox had safely piloted through the House of Commons should never pass into law; several persons calling themselves his friends aided him in accomplishing his object, and the ministry, after being defeated by a small majority in the House of Lords, was summarily and contemptuously dismissed. Twenty-two years elapsed before Fox returned to office.

Within three months after his dismissal, Fox endeavored to counteract the power of the sovereign to dissolve parliament; but he was baffled by the boldness and patience of William Pitt, the young prime minister. Then followed a more trying discomfiture when the country pronounced in favor of his rival at the general election of 1784. Even the Nonconformists, who had no warmer advocate than Fox, and whose only hope for the redress of intolerable grievances consisted in the Whig party being in office, turned against their true friends, rallying to the shout of "Pitt and the constitution," instead of aiding by voice and vote the cause of "Fox and free government." They deserted him at a critical juncture. Nevertheless he continued to plead for them with his whole heart and soul, and merely remarked, "on recollection of what had been their conduct upon that occasion [the coalition], the House would at least do him the justice to say that, in supporting them that day, he was not influenced by any very obvious motives of private partiality or attachment. Yet he was determined to let them know that, though they could upon some occasions lose sight of their principles of liberty, he would not upon any occasion lose sight of his principles of toleration." It was not enough for the king and the young and haughty premier that the Whig party should be defeated in the country; they were resolved to exclude Fox from parliament, and in any case to prevent his reelection for Westminster. Admiral Lord Hood, Sir Cecil Wray, and Fox were the candidates for the two seats. The court and the ministry were bent upon the first two being chosen. What the king styled "gold pills" were lavished on the occasion. Moreover, 280 of the Guards were sent to vote as householders, a thing which Horace Walpole said his father "in the most quiet season would not have dared to do." The character of the struggle recalled an envenomed contest eighty-nine years previously, when the Jacobites strove with all their might to hinder the reelection of Sir Stephen Fox, a declared supporter of the Revolution settlement. In 1784, as in 1695, the party of freedom and constitutional government carried the day in Westminster, and Fox was returned by a majority of 236. But the partisans of divine right in 1695 never dreamed of retrieving their defeat in the manner which found favor in the eyes of George III. and his advisers in 1784. A scrutiny was demanded, in order that Fox might not take his seat. Happily, this pettifogging maneuver was thwarted by the action of attached friends, who procured his election for the Kirkwall burghs. The validity of this election was challenged, but without result, and Fox was able to make that impassioned and masterly protest in the House of Commons against the shameful treatment to which he had been subjected, which is known as his speech on the Westminster scru-



tiny, and which ranks among the best speeches ever delivered in parliament. The scrutiny went on for a year, till even Pitt's docile majority resented the further continuance of the unconstitutional farce, and voted that it should end. In consequence of this Fox took his seat as member for Westminster, brought an action against the high bailiff, who had conducted himself in the affair as a tool of the ministry, and recovered £2,000 damages, which he distributed among the Westminster charities. The remainder of Fox's parliamentary career is more remarkable for eloquent speeches than for stirring personal incident. His criticism of Pitt's measures was always shrewd and vigorous, though not invariably just. He blundered most seriously in denouncing the commercial treaty with France, a scheme of far-seeing policy and admirable patriotism. When this subject was debated he gave utterance to a phrase which, like the utterances of many other notable men, has been repeated to his discredit by persons who, purposely or inadvertently, dissociate it from the context, and withhold the qualifying clauses. Having said that "France was the natural political enemy of Great Britain," he was reproached for calling the French the natural enemies of the English. What he meant to convey was, not that enmity naturally existed between the English and the French, but that the policy of France, as directed by the house of Bourbon, was irreconcilably opposed to the interest of England—a proposition which was really incontrovertible. His liking for the French people was extreme, and this was openly displayed as soon as they had emancipated themselves from a rule which they detested, and which rendered them the disturbers of the world. Then he avowed his conviction that the new form of government in France "would render her a better neighbor, and less disposed to hostility, than when she was subject to the cabal and intrigues of ambitious and interested statesmen." Again, it is forgotten or concealed by those persons who have censured Fox on account of his objection to this treaty, "that he earnestly recommended, instead of the present treaty, a more intimate connection with the United States of America, such an intercourse for Britain that could be devised, and was entirely consistent with her true political interests, and such an intercourse he had the best reason for believing America was both willing and eager to enter into upon fair and equitable terms." Indeed, Washington was anxious to conclude a commercial treaty with Great Britain, but Pitt discountenanced the notion. It was wise in Fox to urge this as most desirable, yet he would have shown still greater wisdom in aiding to the utmost the project for increasing commercial intercourse with France also. On other questions he displayed genuine liberality of sentiment and the highest statesmanship. He declared emphatically against the slave trade at the time when Pitt took credit for delivering no opinion in favor or in disapproval of the traffic in negroes. He repeatedly moved for the repeal of the Test and Corporation Acts, and he advocated a thorough-going scheme of parliamentary reform. He was one of the managers when Warren Hastings was impeached by the Commons of England of high crimes and misdemeanors; he had mastered the subject, spoke on it in a more business-like, though less rhetorical and sensational style than Burke and Sheridan, while his judgment was accepted as conclusive when his brother managers differed in opinion. His health being impaired, he went to the Continent in 1788 for relaxation and change, revisiting Switzerland and Italy. At Bologna, in November, 1788, he received an urgent summons to return home, owing to the meeting of parliament on the 20th of that month having been rendered necessary on account of the king's sudden and

serious illness. While journeying to England he heard a report that George III. was dead, the truth being that the monarch had been suddenly bereft of his reason. Traveling with all the speed possible in those days, Fox arrived in London on the ninth day after leaving Bologna. He had gone abroad for his health; the journey back nearly killed him. Both Pitt and he made mistakes during the debates on the regency, both thinking less of what was best to be done in the circumstances than about the most suitable course to pursue for the purpose of securing the supremacy of their respective parties. Pitt dreaded the loss of office should the Prince of Wales become regent, with full power to conduct the government; Fox was confident that, if the prince exercised the royal prerogatives, a Whig administration would be constituted. The unexpected recovery of the king put an end alike to hopes of promotion and fears of dismissal; but the record of blunders which cannot be excused, and of aspirations which were wanting in patriotism, remained to sully the fame of Tory and Whig leaders. The divergence of opinion between the Whig and Tory parties, and among the members of the Whig party, grew wider and more deplorable when the French Revolution agitated Europe, and terrified many Englishmen. An outcry was raised against French principles, and against those persons who held that the surest way to avert danger to England was to remove all reasonable grounds for popular dissatisfaction. The mob of Birmingham, frenzied with panic and overflowing in loyalty, pillaged the houses of Doctor Priestley and other Nonconformists, in order to testify attachment to "church and king," a cry which Doctor Parr characterized as the toast of Jacobites and the yell of incendiaries, meaning, "a church without the gospel, and a king above the laws." Handbills circulated in the neighborhood where Fox dwelt contained the threat, "Destruction to Fox and his Jacobite crew."

Pitt died in January, 1806. The ministry of "All the Talents" was then formed, with Lord Grenville as first lord of the Treasury, and Fox as secretary of state, despite the aversion and resistance of George III. Though loving peace as much as ever, Fox was yet ready to resist the inordinate pretensions of Bonaparte, and he declared war against Prussia, when that power, acting as the vassal of the French conqueror and at his suggestion, annexed Hanover. Fox's last appearance in the House of Commons was on June 10, 1806. Feeble in health, he appeared there at the risk of his life; but he could not forbear making a special effort in order to move resolutions preparatory to introducing a bill for the suppression of the slave trade. The resolutions were carried by large majorities in both Houses. The bill giving effect to them became law the following year. In this, his farewell speech, he said: "So fully am I impressed with the vast importance and necessity of attaining what will be the object of my motion this night, that if, during the almost forty years that I have had the honor of a seat in parliament, I had been so fortunate as to accomplish that, and that only, I should think I had done enough, and could retire from public life with comfort, and the conscious satisfaction that I had done my duty." On September 13, 1806, he died, at the age of fifty-eight, of a schirrous affection of the liver. The room in which he drew his last breath is in the duke of Devonshire's villa at Chiswick, and is the one wherein, at a later day, Canning died also.

FOX, GEORGE, the founder of the "Society of Friends" or "Quakers," was born at Drayton, Leicestershire, in July, 1624. In 1643, being upon business at a fair, and having accompanied some friends to the village public-house, he was deeply scandalized by a



proposal to "drink healths," and abruptly withdrew in great grief of spirit. "When I had done what business I had to do I returned home, but did not go to bed that night, nor could I sleep, but sometimes walked up and down, and sometimes prayed and cried to the Lord, who said unto me, 'Thou seest how young people go together into vanity and old people into the earth; thou must forsake all, both young and old, and keep out of all, and be a stranger unto all.' Then, at the command of God, on the ninth day of the seventh month, 1643, I left my relations and broke off all familiarity or fellowship with old or young." Thus briefly he describes what appears to have been the greatest moral crisis in his life. The scenes of his early labors and early successes were in the neighborhood of Dukinfield and Manchester, where he had "great openings and prophecies," and succeeded in establishing his influence over a considerable number of followers. From this date his creed grew rapidly in point of explicitness, especially on its negative and practical sides. For example, in 1648 it was revealed to him by the inner light that he was not to take off his hat to any person, high or low; that he was to use in addressing any single individual of whatever rank no other pronouns than the simple "thou" and "thee;" that he was not to bid people good morning or good evening; and that he was not to "bow or scrape with his leg to any one." Increasingly persuaded of the truth and importance of his message, he daily became bolder in the delivery of it. In the year 1649, as he was walking toward Nottingham on a first-day morning accompanied by some friends, he heard the bell of the "steeple house" of the city, and was admonished by an inward voice to go forward and cry against the great temple and the worshipers in it. Entering the church he found the preacher engaged in expounding the words, "We have also a more sure word of prophecy," from which the ordinary Protestant doctrine of the supreme authority of Scripture was being enforced in a manner which appeared to Fox so defective or erroneous as to call for his immediate and most energetic protest. Lifting up his voice against the preacher's doctrine, he declared that it is not by the Scripture alone, but by the divine light by which the Scriptures were given, that doctrines ought to be judged. The result of the disturbance which not unnaturally ensued was that he was seized by the constables and carried off to prison, where he was detained for some time, and from which he was released only by the favor of the sheriff, whose sympathies he had succeeded in enlisting. A similar adventure at Derby ended less favorably. For raising a discussion which seemed not unlikely to end in a breach of the peace in the church there, he was brought before the magistrates, and after examination, committed along with one of his comrades to the house of correction as a blasphemer; and not till the beginning of 1651, after he had been a prisoner for almost a year, did he succeed in regaining his freedom.

While his labors were for the most part confined to the middle and northern counties of England, he found time in 1657 for a tour through Scotland, which, in his opinion, was not altogether without result. In 1669 he married the widow of a Welsh judge, Margaret Fell, who, with her family, had been among his earliest converts; but almost immediately afterward his proselytizing ardor impelled him to proceed alone to Barbados, Jamaica, and the American continent. In all places visited by him there he met with a good reception, and was successful in making many converts. Shortly after his return in 1673 he was, as has been already noted, apprehended in Worcestershire for attending meetings that were forbidden by the law. He was ultimately set at liberty on account of errors in the indictment which

had been drawn up against him, but this was not until after he had suffered a captivity of nearly fourteen months. In 1677 he visited Holland along with his followers Barclay and Penn; and this visit he renewed in 1684, extending his tour through a considerable part of North Germany. The latter years of his life were spent mostly in London, where he continued to give public addresses, comparatively unmolested, until within a few days of his death, which took place November 13, 1690.

FOX, RICHARD, an English prelate, statesman, and diplomatist, bishop successively of Exeter, Bath and Wells, Durham, and Winchester, and founder of Corpus Christi College, Oxford, was born about the close of the reign of Henry VI. Fox was founder of free schools at Taunton and at Grantham. He became blind some years before his death, and was pressed by Wolsey to resign his see to him, but this he stoutly refused to do. He died, in a good old age, September 14, 1528.

FOXE, JOHN, was born at Boston in Lincolnshire in 1517. At the age of sixteen he entered Brasenose College, Oxford, where at twenty-one he took the degree of B.A., and five years later that of M.A. He attained a fair reputation for scholarship, was elected to a fellowship at Magdalen, and wrote several Latin plays on Scriptural subjects, of which the best is the *De Christo Triumphante*. He hated impartially all religious persecution, and he wrote to Queen Elizabeth pleading even for the despised Dutch Anabaptists. It is interesting to note that Foxe was one of the earliest students of Anglo-Saxon, and that John Day was the only printer of the day who could print the Anglo-Saxon characters. In 1571 they published, under the patronage of Archbishop Parker, an edition of the Saxon Gospels, dedicated to the queen. Foxe died on April 18, 1587, at the age of seventy, and was buried in the Church of St. Giles, Cripplegate. His life was written by his son, Samuel Foxe.

FOXGLOVE. See DIGITALIS.

FOY, MAXIMILIEN SÉBASTIEN, French general and political orator, was born at Ham in Picardy, February 3, 1775. He was the son of an old soldier who had fought at Fontenoy, and had become postmaster of the town in which he lived. His father died in 1780, and his early instruction was given by his mother, a woman of English origin and of superior ability. He continued his education at the college of Soissons, and thence passed at the age of fourteen to the artillery school of La Fère. After eighteen months' successful study he entered the army, served his first campaign in Flanders (1791), and was present at the battle of Jemmapes. He soon attained the rank of captain, and served successively under Dampierre, Jourdan, Pichegru and Houssard. In 1794, in consequence of having spoken freely against the violence of the extreme party at Paris, he was imprisoned by order of the commissioner of the convention, Joseph Lebon, at Cambray, but regained his liberty soon after the fall of Robespierre. He served under Moreau in the campaigns of 1796 and 1797, distinguishing himself in many engagements. The leisure which the treaty of Campo Formio gave him he devoted to the study of public law and modern history, attending the lectures of Professor Koch at Strasburg. Recommended by Desaix to the notice of General Bonaparte, he joined the army assembled for the invasion of England, and afterward fought, with much regret, against the Swiss. He gained the confidence of Masséna, and was promoted *chef de brigade*. After the peace of Amiens he returned to France with the rank of colonel. He was at Paris at the time of Moreau's trial, and having earnestly censured the proceedings escaped arrest only by joining the army in Holland. Foy voted against



the establishment of the empire, but the only penalty for his independence was a long delay before attaining the rank of general. In 1806 he married a daughter of General Baraguay d'Hilliers. In the following year he was sent to Constantinople, and there took part in the defense of the Dardanelles against the English fleet. He was next sent to Portugal, and served in the Peninsular war from the battle of Vimeira to the battle of Orthez, at which he was severely wounded. At the first restoration of the Bourbons he was made one of the inspectors-general of infantry, and was stationed at Nantes. He joined Napoleon I. on his escape from Elba, and fought with distinction at Quatre-Bras and at Waterloo, where he was again badly wounded. After the second restoration he returned to civil life, and in 1819 was elected to the chamber of deputies. For this position his experience and his studies had especially fitted him, and by his first speech he gained a commanding place in the chamber, which he never lost, his clear, manly eloquence being always employed on the side of freedom and justice. In 1823 he made a powerful protest against French intervention in Spain, and after the dissolution of 1824 he was reelected for three constituencies. He died at Paris, November 28, 1825, and his funeral was celebrated amidst the mourning of the city and the nation. His family were provided for by a national subscription.

FRAAS, KARL NIKOLAS, a German botanist and agriculturist, was born at Stettelsdorf, near Bamberg, September 8, 1810. After receiving his preliminary education at the gymnasium of Bamberg, he in 1830 entered the university of Munich, where he took his doctor's degree in 1834. Having devoted great attention to the study of botany, he went to Athens in 1835 as inspector of the court garden; and in April, 1836, he became professor of botany at the university. In 1842 he returned to Germany and became teacher at the central agricultural school at Schleissheim. In 1847 he was appointed professor of agriculture at Munich, and in 1851 director of the central veterinary college. For many years he was secretary of the Agricultural Society of Bavaria, but resigned in 1861. He died at his estate of Neufreimann near Munich, November 9, 1875.

FRA BARTOLOMEO. See BACCIO DE LA PORTA.

FRACASTORIO, HIERONYMO, a learned physician and poet, was born at Verona in 1483. It is related of him that at his birth his lips adhered so closely that a surgeon was obliged to divide them with his incision knife, and that during his infancy his mother was killed by lightning, while he, though in her arms at the moment, escaped unhurt. Fracastorio became eminently skilled, not only in medicine and belles-lettres, but in most arts and sciences. It was by his advice that Pope Paul III., on account of the prevalence of a contagious distemper, removed the council of Trent to Bologna. He was the author of many works, both poetical and medical, and was intimately acquainted with Cardinal Bembo, Julius Scaliger, and most of the great men of his time. He died of apoplexy at Cusi, near Verona, on August 8, 1553; and in 1559 the town of Verona erected a statue in his honor.

FRA DIAVOLO is the popular name given by his countrymen to the most notorious and dreaded of modern Italian brigands; and the name, associated during his lifetime with the political revolutions of southern Italy, has acquired a world-wide celebrity since it became the title of a favorite French opera. His real name was Michele Pezza. It would be as hopeless to fix the precise dates in his career as to determine those in the lives of Rob Roy or Jonathan Wild. He is stated, however, to have been born at Itri. His crimes

became invested with a more general and political interest in 1799. At that time, from the frequency and audacity of his robberies and murders along the frontier of the Terra di Lavoro, he became known as Fra Diavolo, the popular superstition investing him with the blended attributes of a monk and a demon. When the kingdom of Naples was overrun by the troops of the French Republic, Fra Diavolo, acting in concert with the head of the Bourbon partisans, Cardinal Ruffo, waged a fierce and untiring war against the French soldiers, whenever his superior knowledge of the localities afforded the prospect of his being able to do so with effect. He continued for a considerable period in absolute possession of the line of communication from the Garigliano to Portello, falling upon and massacring the French Government couriers, and all whom he suspected of conveying information to the military or civil functionaries of the Republic. At one moment he succeeded in completely interrupting all communication between Naples and Rome. Like his fellow agents under Cardinal Ruffo—like Mammone, Pronio, Sciarpa Guarriglia—he styled himself "the faithful servant and subject of his Sicilian Majesty." As the turning point in Fra Diavolo's career must be regarded the arrival in Naples of Joseph Bonaparte, and the establishment of the extraordinary tribunals charged with the repression of this half civil half political brigandage. Fra Diavolo was sentenced to death, and a price set on his head. After spreading terror through Calabria by his deeds of cruelty he had passed over into Sicily, but soon returned to the mainland at the head of 300 liberated convicts placed at his disposal by the Bourbon Government. His landing at Spelunza with these ruffians was marked by unusual excesses, but the French troops were everywhere on the alert to capture him, and he was compelled to seek refuge among the woods and mountains of Lenola. During a period of two months he succeeded in evading his pursuers, always in the hope of making his way back to Sicily. At length, exhausted by hunger and requiring medical aid, he repaired in disguise to the village of Baronissi, but was there recognized and put to death. It is stated that on his person were found papers from Queen Caroline of Naples and Admiral Sydney Smith, those from the former recognizing his rank as colonel in the Bourbon army, and that in his last moments he cursed both his employers and his own folly which had led him to engage in such a reckless enterprise.

FRÄHN, CHRISTIAN MARTIN, a numismatist and historian, was born at Rostock, June 4, 1782, and died at St. Petersburg, August 28, 1851. He commenced his Oriental studies under Tyschsen at the university of Rostock, and afterward prosecuted them at Göttingen and Tübingen. He became a Latin master in Pestalozzi's famous institute in 1804, returned home in 1806, and in the following year was chosen to the chair of Oriental languages in the Russian university of Kasan. Though in 1815 he was invited to succeed Tyschsen at Rostock, he preferred to go to St. Petersburg, where he became director of the Asiatic museum and councilor of state. The indefatigable ardor with which he pursued his studies is shown by the number of his works.

FRAMINGHAM, a town of Middlesex county, Massachusetts, on the Sudbury river, twenty-four miles west by south of Boston. It possesses good railroad, telegraph and banking facilities and has manufactures of straw goods and blankets. Population (1890), 9,239.

FRAMLINGHAM, a market-town of England in the county of Suffolk, about four miles northeast of Ipswich.

FRANÇAIS, ANTOINE, Count, better known as François of Nantes, a French politician and author, was





Longitude West from Greenwich. 16° 14° 12° 10° 8° 6° 4° 2° 0° Longitude East from Greenwich. 2° 4° 6° 8° 10° 12° 14° 16°

ENGLAND

CHANNEL

FRANCE

ITALY

SPAIN

MEDITERRANEAN SEA

CORSICA

Scale of Miles 0 10 20 30 40 50 60 70 80 90 100

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born at Beaurepaire in the department of Isère on January 17, 1756, and died at Paris on March 7, 1836.

FRANCAVILLA, a town of Italy, in the province of Lecce, about twenty-one miles west-southwest of Brindisi, sometimes called Francavilla Fontana, to distinguish it from Francavilla in Sicily and other towns of the same name.

FRANCE. This important part of continental Europe extends from the 43d to the 51st degree of north latitude, and from longitude 7° 35' E. to longitude 4° 43' W. The boundaries of France are—on the north the English Channel, the Straits of Dover, Belgium and Luxembourg; on the east Germany, Switzerland and Italy; on the south the Mediterranean and Spain; on the west the Atlantic Ocean. From north to south its length is about 576 miles, measured from Dunkirk to the Col de Falguères; its breadth from east to west is about 494 miles, from Mount Donon to Cape Saint-Mathieu at the extremity of Brittany, which projects into the Atlantic, like a wedge, and without which France would approach in form to a square; and its superficial extent, including Corsica and the small islands on the coast, is 204,147 English square miles, nearly twice the total area of the British Isles.

France exhibits, in general, an advantageous succession of high and low ground. Less level than Poland, the north of Germany, or the greater part of European Russia, it is, on the whole, less mountainous than Spain or Italy, and may with great propriety be compared to England, with this distinction that, while in the latter the mountainous tracts are in the north and west, in France they are in the south and east. Throughout Flanders, Picardy, Normandy, and the countries to the north and south of the Loire, we find plains, diversified occasionally by hills (either insulated or rising in succession), but having none of those massy elevations entitled to the name of mountains. The south and east of France, on the contrary, are rugged and elevated tracts.

*Climate.*—The climate of France is generally temperate, but by no means uniform. The division into the north, west, south, and central regions, although it seems the most natural, does not satisfactorily correspond to the actual differences.

*Population.*—On May 30, 1886, the population of France amounted to 38,218,903, or 187 to the square mile. Among the inhabitants there were, in the same year, 1,126,531 foreigners, of whom 432,265 were Belgians, 240,733 Italians, 81,986 Germans, 73,781 Spaniards, 66,281 Swiss, 37,006 British and Irish, 21,232 Dutch, 12,090 Austro-Hungarians, 10,489 Russians and Poles, 9,816 Americans (including South Americans). The large increase of the foreign population in France in the last twenty years caused dissatisfaction among the native laboring classes, and on October 2, 1880, the government issued a decree imposing onerous conditions on the residence of citizens of foreign states in France. Every foreigner settling in France is now required to make a declaration, within fifteen days of his arrival, at the *mairie* of the commune where he intends to fix his residence, or at the prefecture, if it is in Paris or Lyons, setting forth (1) his name and those of his parents, (2) his nationality, (3) the place and date of his birth, (4) the place of his last domicile, (5) his profession or means of subsistence, (6) the names and nationality of his wife and minor children, in case they accompany him.

*Government.*—The governments which have ruled France since 1789 have been many, and have presented wide differences. We have not, however, to consider here those frequent changes, which belong to history; we have merely to state from a geographical and statistical point of view how France is now governed and administered. The law of February 25, 1875, con-

firmed in France the republican government which had existed from the fall of the empire; but the institutions of the country still bear strong evidence of their monarchical origin and tendency. The sovereignty of the people, acknowledged and proclaimed since 1789, is now represented by three powers—the chamber of deputies, the senate and the president of the republic. The deputies are elected by universal suffrage; each district or “arrondissement” sends one deputy to the chamber, if its population does not exceed 100,000, and an additional deputy for every additional 10,000 inhabitants, or fraction of that number. The senate consists of 300 members. The president of the republic is chosen for seven years by the senate and chamber of deputies voting together. He promulgates the laws passed by the parliament; he has the command of the land and sea forces, but cannot declare war without the advice of the chambers; he makes treaties of peace, alliance and commerce, nominates all government officers, and has power to dissolve the chamber of deputies, with the sanction of the senate. He receives a yearly salary of 600,000 francs, with an allowance of 162,400 francs for household expenses. Senators and deputies have an allowance of 9,000 francs each per annum. It may here be interesting to compare the salary now paid to the president of the republic with the civil list or revenue of the various dynasties which have successfully ruled France since the beginning of the century. Louis XVIII. had 15,510,000 francs per annum, and 4,000,000 were allowed to the royal family. Charles X. got 25,000,000 for himself and 7,000,000 for the princes. Louis Philippe was satisfied with 12,000,000 francs a year, and adequate allowances to his children. And lastly, the second empire cost 25,000,000 francs a year, not including the pensions to the members of the imperial family, the revenues of the palaces, castles and forests, and those mysterious resources which have become known by the name of *virements*.

Next to these three great powers must be mentioned the council of state, presided over by the minister of justice, and composed of a vice-president, twenty-two councilors in ordinary service, fifteen councilors in extraordinary service, representing the different ministers, twenty-four *maîtres des requêtes*, twenty auditors of first class, ten auditors of second class, a general secretary having the title and rank of a *maître des requêtes*, and a *secrétaire du contentieux*. The auditors are appointed after a competitive examination; the councilors in ordinary service are elected by the chamber, and the other members of the council of state are nominated by the president of the republic. The business of the council is to give its advice on the projects of law which the parliament or the government wish to submit to it, and on administrative regulations and by-laws. All disputes arising in matters of administration, and all claims or complaints against administrative officials, are brought before the council of state, whose decision is final. The vice-president receives a salary of 25,000 francs, the presidents of sections or committees 18,000 francs, the councilors 16,000, the *maîtres des requêtes* 8,000 francs, and the auditors of first class 4,000 francs; auditors of second class have no remuneration.

The executive department of the government is administered by the president of the republic and his cabinet council, consisting of nine ministers, viz., the minister of justice and keeper of the seals; the minister of foreign affairs; the minister of the interior; the minister of finance; the minister of war; the minister of marine and colonies; the minister of public instruction, ecclesiastical affairs, and the fine arts; the minister of agriculture and commerce, and the minister of public works. They are appointed by the president of the republic,



and are responsible to the chamber. They receive a salary which has been reduced from 100,000 to 60,000 francs, and may live, if they choose, in the "hôtels" where the duties of their ministry are discharged.

Administratively, France is divided into eighty-seven departments, cut rather arbitrarily out of the territory of the ancient provinces. These departments are subdivided into 362 "arrondissements," 2,871 "cantons," and 36,121 "communes."

Each department is administered by a prefect appointed by the president of the republic, and each arrondissement by a sub-prefect. The prefects are divided into three classes, the salary being 35,000 francs for the first class, 24,000 for the second class, and 18,000 for the third class. The prefect of the Seine has 50,000 francs a year. The authority of each prefect is great in his own department: he can issue local decrees; he appoints and dismisses a number of agents who depend directly on him; he is at the head of the police to maintain public order, and for this purpose can summon the military forces; he superintends the collection of taxes; he is in correspondence with all the subordinate functionaries in his department, to whom he transmits the orders and instructions of the ministers; in one word, he is the general agent of government, and the principal instrument of centralization in the state. He is assisted in his work by two bodies, the general council (*conseil général*), which is elected by universal suffrage, and the council of prefecture, which is nominated by the head of the executive power. The business of the council of prefecture is to decide all legal questions and to advise the prefect, when asked to do so. The general councils assess the taxes, authorize the purchase, sale, or exchange of departmental property, superintend the management of the same, decide about new roads, railways, or canals, vote the budget for sanitary and charitable institutions belonging to the department, and give advice on every matter of local interest, political questions being strictly excluded. The law of February 23, 1872, however, has invested them with great political importance; in case of the parliament being violently dissolved by a *coup d'état*, they must immediately assemble, and form a new parliament with their delegates, in order to oppose by all means the criminal attempt.

As the prefect in the department, so the sub-prefect, with a more limited authority, is the representative of the central power in the arrondissement. He is assisted, and to a certain extent controlled, in his work by the council of arrondissement—an elective body to which each canton of the arrondissement sends one member. Except in that case, the canton is not an administrative division. It will be noticed again in connection with the judicial system of the country.

The commune is the administrative unit in France. At its head is a mayor assisted by deputy-mayors (*adjoints*), the number of whom varies according to the population; communes of 2,500 inhabitants have one deputy-mayor; up to 10,000 inhabitants they have two, from 10,000 to 30,000 they have three, and one additional for every 20,000. The mayor has a double part to perform, as he represents both the central power and the commune; and often it is a difficult matter to avoid a conflict of duties. He is besides *officier de l'état civil*, or official registrar of births, marriages, and deaths. The mayor and deputy-mayor are not salaried officials. In the large towns they are nominated by government, but they must always be chosen out of the municipal council, which is elected on the principle of universal suffrage, and has with regard to the commune much the same power and duties as the general council with regard to the department.

Every canton must have a commissary of police, who is under the direct control of the mayor. This police-officer is appointed by the prefect in towns having not more than 6,000 inhabitants, and by the president of the republic in the others. He has rather complex duties, being at the same time a governmental, judicial, and municipal agent.

Paris and Lyons have in some respects a special and exceptional administration, the consideration of which belongs to the articles devoted to these cities.

Judicial proceedings may be classed under civil, commercial and criminal jurisdictions; there are besides some special departments, such as military and maritime tribunals, councils of discipline, and the *cour des comptes*.

In civil matters, every canton has a *juge de paix*, whose decision is final, when the amount in dispute does not exceed 100 francs (£4); up to 200 francs, he only can give a sentence subject to appeal. His principal business is, however, one of conciliation; and no suit can be brought before the tribunal of first instance till he has endeavored, without success, to bring the parties to agreement.

A tribunal of first instance, or primary court, is established in every arrondissement. Its decision may be appealed against for sums above 1,500 francs. The *cours d'appel* decide the actions when the sentence of the first court has been appealed from. They are twenty-six in number.

Tribunals of commerce, to decide disputed points arising out of business transactions, are instituted in all the more important commercial towns, and consist of judges chosen from among the leading merchants, and elected by their fellows. For sums above 1,500 francs, there can be appeal from their decision. In small towns, the judges of the civil tribunal decide such commercial cases.

The courts of criminal jurisdiction are of three kinds. The tribunals of ordinary police (that is, the justice of the peace court in each canton) have the cognizance of small offenses, which are punishable by a fine of not exceeding fifteen francs (12s.), or by imprisonment not exceeding five days. Offenses of a more serious character, which French law calls *délits*, are judged by a special section of the tribunals of first instance, bearing the name of *tribunal correctionnel*. This tribunal can be appealed to from the sentences pronounced by tribunals of police; but its judgments are also subject to the revision of the *cours d'appel*. Offenses which rank as crimes are judged by the *cour d'assises*, consisting of three magistrates and twelve jurors. The jury, as in England, decides only on the facts of the case, leaving the application of the law to the judges. The assizes are the only courts that are not stationary. They are held in the chief towns of the departments once in three months. In all criminal suits, the first inquiry is confided to a special magistrate attached to the tribunal called *juge d'instruction*. He conducts the necessary investigations privately and with almost absolute power. An order of *non-lieu*, issued by this magistrate, at once puts an end to any prosecution. But if he finds that the case should go to trial, he hands it over to the court, before which a public prosecutor, with the title of *procureur*, or *procureur-général de la république*, maintains and endeavors to prove the accusation.

Above these various tribunals the court of cassation stands supreme. It is held at Paris, and is composed of three chambers, the *chambre des requêtes*, the *chambre civile*, and the *chambre criminelle*. Its province is to decide in all appeals from the other courts, investigating, not the facts of the case, but the forms of law, and ordering, wherever these have been infringed or deviated from, a new trial before such other tribunal as it thinks fit.



Among the special jurisdictions may be mentioned the military tribunals or councils of war, which sit in judgment on crimes and offenses committed by soldiers, or by civilians in a town or district proclaimed by the government as in a state of siege; the maritime tribunals, which are to the navy what the councils of war are to the land forces; and the councils of discipline for lawyers and other professional corporations. The *cour des comptes* deserves special notice. It consists of three chambers, with a president in chief over the whole court, and three presidents (one for each chamber), a general procurator, a chief *greffier*, one hundred and two councilors, twenty auditors, and eighty-one clerks. This important institution, which costs 1,554,500 francs a year, was created in 1807 in order to control all the accounts of the government officials. Certain agents who are not magistrates are, however, connected with the administration of justice. Such are the *greffiers* (clerks of the court), who keep the archives, and receive a salary from the government; the *huissiers* (sheriff-officers), who give notice of summons and sentences; and the *avoués* (solicitors) and the public notaries (*notaires*).

Although the prisons are attached to the ministry of the interior, it is impossible to treat of the administration of justice without saying a word about them. The convicts who have to serve more than one year are distributed into twenty-four central prisons (*maisons centrales*). Departmental prisons receive those whose sentence does not exceed one year. Political convicts are kept in custody in the two *maisons de détention* of Doullens (Somme) and Belle-Ile (Morbihan). Two places of transportation, Cayenne and New Caledonia, receive those who were formerly confined in *bagnes*, or convict prisons. The population of those penal colonies is considerably increased by the victims of internal discord.

The public peace is maintained by an armed police or *gendarmerie*, partly on foot and partly mounted; and in all emergencies, when this force is found insufficient for the preservation or execution of the laws, the troops may be called in to assist, subject, however, to the orders of the police. About 7,000 *gardiens de la paix*, formerly *sergents de ville* (policemen), under the orders of the prefect of police, form in Paris an additional police force; and similar organizations exist in all the larger towns.

*Religion and Education.*—In the census of 1881 78.5 per cent. of the population, or 29,201,703 persons belonged to the Roman Catholic Church; 1.8 per cent., or 692,800, were Protestants; 53,436 were Jews and 7,684,906 persons confessed no particular creed. All religions are equal before the law and those sects whose adherents number more than 100,000 may claim state allowances. In the budget of 1888, the sum of 45,743,563 francs were thus allowed and distributed as follows: Roman Catholics, 43,503,723 francs; Protestants, 1,551,600 francs; Jews, 180,900 francs; Mohammedans, 216,340 francs; administration, etc., 291,000 francs.

Public education is supervised by the central government. In 1885–86 there were 85,887 elementary schools, 63,207 of which were lay schools, and 22,680 clerical schools; 70,313 were public and the rest private schools. The total number of pupils was 6,274,563, of whom 4,988,758 were educated in the public schools. In November, 1884, there were 381 secondary schools, with 98,495 pupils. The number of normal schools in 1886 amounted to eighty-seven for males and seventy-five for females. For adult males education is provided in 6,667 communes, and for adult females in 1,135 communes. The number of graduates at the state universities in 1884 was 12,195. In that year 8,307 students attended the Uni-

versity of Paris. There are also numerous technical, industrial and other special schools. The total sum devoted to educational purposes in 1886–87 was 94,497,000 francs, of which sum 81,460,000 francs went for primary, and 13,037,000 for intermediate education. For the sixteen schools of letters and philosophy, fourteen of law and six of medicine, the sum of 11,709,214 francs was assigned in the budget. The state faculties of theology were abolished in 1885; but, as the Protestant faculties at Montauban and Paris are the only legal training colleges for the two Protestant state churches, they have since been continued by annual vote of the chambers.

The highest institution founded and kept up by the French Government on behalf of science and literature is the *Institut de France*, composed of five academies as follows:

| ACADEMIES.                                       | Sections | Members. | Honorary Members. | Foreign Members. |
|--------------------------------------------------|----------|----------|-------------------|------------------|
| Academie Francaise..                             | ..       | 40       | ..                | ..               |
| Academie des Inscriptions et Belles-Lettres..... | 11       | 40       | 10                | 8                |
| Academie des Sciences                            | 11       | 63       | 10                | 8                |
| Academie des Beaux-Arts .....                    | 5        | 40       | 10                | 10               |
| Academie des Sciences morales et politiques....  | 6        | 40       | 5                 | 5                |

The *Académie de Médecine* is a separate body, divided into eleven sections; it is composed of 100 resident members, and a number of fellows and correspondents, chosen from among the medical celebrities of the world.

Although there is no poor-law in France, charitable establishments, either private or created and managed by the state, are very numerous, and, on the whole, efficient. *Orphelinats* (orphans' houses) receive infants which have neither parents nor friends to care for them; *crèches* and *salles d'asile* (infant schools) gratuitously give shelter and the first elements of education to poor children whose mothers must earn their daily bread by out-door work; young girls of the destitute class may learn a trade in the *ouvroirs* or workshops freely open to them in many towns; while lads find employment and agricultural training in such establishments as the *colonies agricoles* of Mesnil-St.-Firmin (Oise), St. Jean, Petit-Mettray (Somme), Lesparre (Gironde), Montmorillon (Vienne), etc. There are also other charitable institutions, analogous to those which exist in other countries. Besides these private charities, more or less supported by government grants, there is a special department, called *assistance publique*, a branch of the ministry of the interior, established to superintend, and in some cases organize, the *bureaux de bienfaisance* and hospitals. The *bureaux de bienfaisance* give out-door relief to the poor when it is deemed necessary.

The number of hospitals, in addition to the *Maison Municipale de Santé* and the seven great establishments of Paris, is 1,481, furnished with 161,520 beds, and employing 2,673 physicians and surgeons, 3,212 officials, 11,032 nuns, and 11,534 servants. In 1873 the number of patients received was 410,441—that is, one patient for eighty-eight inhabitants. Out of one hundred patients, seventy-nine were discharged cured, at least for a time, and the death average was not above 9 per cent. Besides the patients who only pass through the wards (thirty-seven days is the average duration of their stay), 69,786 infirm, incurable, or old people live as inmates in some of the hospitals, which are specially designated by the name *hospice*; this number is divided into 27,256 men, 31,037 women, and 11,493 children.



All the agents who have the charge of collecting taxes are under the minister of finance, who, besides, distributes to the other departments the sums necessary for their expenses. In each department a *trésorier payeur général* receives the taxes raised in his district, and is accountable for them to the central office of the treasury at Paris. These *trésoriers payeurs généraux* have a salary of 6,000 francs a year, but they also get a percentage on the amount of taxes collected, and are allowed to transact private banking business with the funds of the state, as well as with their own. As security they have, before entering on their duties, to deposit with the treasury a sum, which varies with the importance of their situation, but on an average amounts to 800,000 francs. A part of their business is to pay the creditors of the state in their respective departments. They are assisted in their work by *receveurs particuliers* in each arrondissement, except that in which the *trésorier payeur général* resides.

The taxes that pass through the hands first of the *receveurs particuliers*, then of the *trésoriers payeurs généraux*, and finally into the treasury, are of two kinds, direct and indirect. The land tax, the poll and rent-tax, the tax on doors and windows, the license tax, and the tax on money invested in public funds or in bonds of private companies (*valeurs mobilières*) are now the chief sources of the direct revenue of the French treasury. The land-tax or *contribution foncière* is assessed on the net revenue of landed property.

*Finances.*—The financial accounts of 1870 and 1871 showed a surplus. Since that time there has been a deficit every year. The increased expenditure has been covered chiefly by new indirect taxes, such as customs duties, stamps, the sugar tax, and duties on wine, salt, and railroad transportation. On March 13, 1888, the Chamber decided to abrogate the privilege that wine and apple growers enjoyed of distilling spirits from their own produce free of tax. The imposition of new duties on live animals caused a large falling off in the cattle imports of 1887, while the import of fresh meat increased. The duty on wheat was raised in March, 1885, and again on April 1, 1887, causing a considerable advance in the price of bread. One effect of the high duty on wheat was, that Belgian bread was imported and sold in large quantities in Paris.

The budget for 1888, presented in February, 1887, calculated the ordinary revenue at 3,253,583,183 francs, to be derived from the following sources: Indirect taxes, domains, and state monopolies, 2,778,829,689 francs; direct taxes 474,753,494 francs.

The estimated ordinary expenditures is 3,253,104,738, the principal items being: Ministry of War, 695,934,530 francs; Ministry of Marine, 219,883,311 francs; Ministry of Public Works, 176,046,604 francs; Ministry of Public Instruction, 133,048,190 francs; other ministries, 256,322,445 francs; interest, etc., on the public debt, 1,337,275,671 francs; administration and salaries of the president, senators and deputies, 345,860,097 francs. The extraordinary expenditures, balanced by receipts from special sources, were 473,605,131 for the home office, treasury and other special votes, and 83,796,200 francs for special state expenses. Of this latter amount 32,870,000 francs went to the account of state railways, 13,064,700 francs for naval invalids, 9,307,500 francs for the legion of honor, and 9,221,600 francs for the savings banks. In June, 1887, the budget for 1888 was cut down by 182,205,000 francs, leaving the corrected expenditures, ordinary and extraordinary, 3,628,301,069 francs.

The total consolidated debt of France amounted in 1888 to 23,728,096,228 francs, the interest upon which is 826,241,131 francs annually, divided as follows: 3 per cent.

rente, 482,934,911 francs; 4 per cent. rente, 446,096 francs; 4½ per cent. rente, 305,426,874 francs. The redeemable debt, life annuities, and other engagements of the treasury, swell the capital of the debt to about 32,500,000,000 francs. All the communes and departments of France have their own budgets and debts.

*Army.*—The peace strength of the French army in 1888 was 499,789 officers and men, and 118,927 horses. To this may be added the gendarmerie and the Garde Républicaine, amounting in all to 25,922 officers and men.

The territorial army numbers 37,000 officers, and 579,000 men. In times of war France is capable of raising about 3,750,000 men, of which number 2,500,000 have received some military instruction. The expenditure for the army in 1888 was 694,934,530 francs.

France is divided into eighteen military corps, each under the command of a general of division, and subdivided into districts, each under a general of brigade. There is a separate service for the strong places. Paris is fortified as a central place of arms. The first-class frontier fortresses are Lille, Dunkirk, Arras, and Douai, on the Belgian frontier; Belfort, Verdun, and Briançon, on the German; Lyons, Grenoble, and Besançon on the Italian; the naval harbor of Toulon, on the Mediterranean coast; Perpignan and Bayonne, on the Spanish frontier; Rochefort, L'Orient, and Brest, on the Atlantic coast, and Cherbourg, on the channel coast.

*Navy.*—The effective navy in 1888 consisted of three hundred and ninety-three vessels, comprising seventeen line-of-battle iron-clads, nine iron-clad cruisers, ten iron-clad *guarda costas*, four iron-clad gun-boats, nine battery cruisers, nine first class cruisers, fifteen of the second and eighteen of the third class, two torpedo cruisers, fourteen avisos of the first, twenty-six of the second and six of the third class, thirteen transport avisos, six torpedo avisos, twenty gun-boats, forty sloop gun-boats, ten sea-going torpedo boats, seventy-two first class and forty-one second class torpedo boats for coast defense, five pontoons, twenty-five transports and twenty-two sailing vessels.

The *Caiman* and the *Terrible*, sister ships to the *Indomptable*, belted ships, with 19½ inches of compound armor at the water-line, carrying 75-ton guns mounted *en barbette* in two fixed towers, are practically completed, and the *Requia* is nearly so. The *Admiral Baudain*, a monster iron-clad of 11,200 tons displacement, with 21¼-inch plates at the water-line, armed with three 60-ton and twelve smaller guns, and the *Formidable*, a sister ship, were completed in 1888. The *Hoche* and the *Neptune*, of 10,500 tons, and the *Morceau*, a heavily-armed steel cruiser with four barbette towers, having three full decks, and fitted with four torpedo tubes, will be ready for service by 1890. Two first class iron-clad squadron vessels, four first class iron-clad gun-boats, four armored gun-boats of the second class, two battery cruisers, two torpedo cruisers, eleven cruisers of various classes, and a number of first class torpedo boats are in different stages of construction. Another first class iron-clad and two torpedo dispatch boats were begun in 1889. Before the end of that year one first class and four third class cruisers will be finished, and three first class, one third class, and the two torpedo cruisers, are expected to be finished the year after. The budget of 1888 sets down the expenditures on the navy to 219,883,311 francs. The valuation of the fleet given in the budget is 502,000,000 francs.

*Railroads.*—In January, 1888, the railroads of France had a total length of 32,248 kilometers (1 kilometer = 0.621 English mile). The state owns but 2,597 kilometers, and does not operate more than half of its lines. The receipts of all the railroads in 1887, were



1,021,424,230 francs, against 1,007,137,227 francs in 1886. The gross receipts of the state lines are estimated at 30,084,000 francs, and the expenses at 25,203,000 francs. During the fiscal year 1887-88 the government built 791 kilometers of additional railroads.

Roads are either national, departmental, military, or *vicinal* (cross roads). National roads are kept up entirely at the expense of the public treasury. The departments have to provide for departmental roads and a portion of the military roads, the rest being charged on the state.

**Agriculture.**—The number of persons gaining their livelihood by agriculture in 1882 was 6,913,000. The total number of agricultural holdings was 5,672,007. The number of owners of land was 4,835,246, which was 405,269 less than in 1862, a part of the decrease being accounted for by the transfer of Alsace-Lorraine, with 187,000 land owners to Germany. Nearly 80 per cent. of the cultivators are owners of their farms, 14 per cent. are tenants, and 6 per cent. are *métayers*, dividing the profits with the landlord, who furnishes the land and the capital.

The number of silk culturists in 1887 was 136,388, against 136,706 in 1886. In 1886 there was imported into France 154,994,874 kilograms of sugar (1 kilogram = to about 2 lbs.), while the home-manufactured sugar amounted to 412,161,821 kilograms. The product of wheat in 1886 was 290,000,000 bushels, and in 1887 it was 322,000,000 bushels. The yield of wine in 1886 was 692,584,728 gallons, in 1887, 536,000,000 gallons. In 1887, 232,800,000 gallons of wine were imported, and 48,114,000 exported. In 1886 the live stock in France, included 2,911,392 horses, 13,104,970 cattle, 22,616,547 sheep, 1,483,000 goats, and 5,681,088 swine.

In France the interests of agriculture are intrusted to a special minister. Under him are general inspectors, whose duty it is to visit the different parts of the country, and to report on their respective position and wants. These reports serve to determine the distribution of grants and rewards which the state dispenses every year.

The principal mines which France possesses are coal and iron mines. Coal-pits are almost exclusively confined to the east, southeast, and north of the country. The richest departments are Nord (239 square miles), Pas-de-Calais (201), Gard (187), Saône-et-Loire (165), Hérault (113), Loire (110), and Bouches-du-Rhône (107). The whole area is about 2,200 square miles, and comprises 623 separate *concessions*, which, however, are not all being worked.

France is very rich in iron mines; but as these are generally far from the districts which produce coal, the working expenses are considerably increased, and sometimes to such an extent that the metal extracted cannot repay the outlay required for its extraction, and the mines have to be abandoned.

**Commerce.**—The total foreign commerce of France in 1887 amounted to 7,590,546,000 francs, 4,270,772,000 francs of which represent imports, and 3,319,774,000 francs, exports. Alimentary substances comprising wines, cereals, fruits, animals, coffee, sugar, etc., form the most important class of commodities, and were imported to the amount of 1,600,387,000 francs, and exported to the amount of 721,175,000 francs.

The values of imported raw products, including wool, raw silk, oils, skins, and hides, cotton, and lumber, were computed at 1,999,836,000 and the value of exports at 717,387,000 francs. Of manufactured articles, including woollen, silk and cotton goods, machinery, metal goods, arms, etc., the imports were 552,091,000 francs. Of miscellaneous products, the value of the

imports was 119,458,000 francs, and that of the exports 187,645,000. In the total foreign commerce of France for 1886, amounting to 7,456,900,000 francs, exclusive of specie, the imports amounted to 4,208,100,000 francs, and the exports to 3,248,800,000 francs. The import of coin and bullion were valued at 443,517,878 francs, and the exports at 333,262,342 francs. The transit trade amounted to 585,000,000 francs in 1886.

The adjoining table shows the trade of France with foreign countries in 1886, expressed in millions of francs.

| COUNTRIES.              | Imports from. | Exports to. |
|-------------------------|---------------|-------------|
| Great Britain.....      | 525           | 855         |
| Belgium.....            | 419           | 448         |
| Spain.....              | 398           | 173         |
| Germany.....            | 335           | 297         |
| Italy.....              | 309           | 192         |
| United States.....      | 293           | 282         |
| Argentine Republic..... | 228           | 110         |
| British India.....      | 192           | 8           |
| Russia.....             | 170           | 10          |
| Turkey.....             | 124           | 46          |
| Algeria.....            | 124           | 189         |
| China.....              | 119           | 4           |
| Switzerland.....        | 108           | 210         |
| Austria.....            | 107           | 14          |
| Portugal.....           | 74            | 23          |
| Brazil.....             | 52            | 57          |

**Colonies.**—The colonial possessions and protectorates of France have a total area of 2,267,034 square kilometers, with a population of 26,003,995. The adjoining table shows the area and population of the colonies and protectorates, according to the latest estimates and returns.

| POSSESSIONS.                           | Square Kilo-meters. | Population |
|----------------------------------------|---------------------|------------|
| <i>Asia</i> —                          |                     |            |
| Possessions in India.....              | 509                 | 275,261    |
| Cochin China.....                      | 59,458              | 1,792,733  |
| French Tonquin.....                    | 90,000              | 9,000,000  |
| <i>Africa</i> —                        |                     |            |
| Algeria.....                           | 667,000             | 3,817,465  |
| Senegambia.....                        | 250,000             | 183,237    |
| Gaboon and Gold Coast.....             | 130,000             | 186,133    |
| Congo region.....                      | 430,000             | 500,000    |
| Reunion.....                           | 2,512               | 179,639    |
| St. Marie.....                         | 830                 | 7,634      |
| Nossi Be and Mayotte.....              |                     | 21,384     |
| Obock.....                             | 10,000              | 22,370     |
| <i>America</i> —                       |                     |            |
| Guiana.....                            | 121,413             | 26,502     |
| Guadeloupe.....                        | 1,869               | 181,098    |
| Martinique.....                        | 987                 | 169,232    |
| St. Pierre and Miquelon.....           | 235                 | 6,300      |
| <i>Oceania</i> —                       |                     |            |
| New Caledonia.....                     | 19,823              | 56,463     |
| Marquesas Islands.....                 | 1,244               | 5,776      |
| Tahiti and Maitea.....                 | 1,179               | 10,639     |
| Tabuai and Raivavai.....               | 269                 | 665        |
| Tuamotu, Gambier and Rapa Islands..... | 1,000               | 8,500      |
| Total colonies.....                    | 1,788,268           | 16,459,995 |
| <b>PROTECTORATES</b> —                 |                     |            |
| Tunis.....                             | 118,000             | 2,000,000  |
| Annam.....                             | 275,300             | 6,000,000  |
| Cambodia.....                          | 83,860              | 1,500,000  |
| Comoros.....                           | 1,606               | 53,000     |
| Total.....                             | 478,766             | 9,553,000  |
| Grand Total.....                       | 2,267,034           | 26,003,995 |

The budget for 1888 estimates 41,841,331 francs for the colonies, including 2,500,000 francs for New Caie.



donia, 6,333,000 francs for Senegambia, 3,000,000 francs for Cochin China, and 3,250,000 francs for Annam.

All these colonies submitted, till 1861, to what was called the colonial pact, which bound them to France so closely and jealously that they could trade with no other nation than the mother country. This state of affairs has been greatly changed, chiefly for Martinique, Guadeloupe, and La Réunion; and but for some privileges of navigation and some special taxes, trade with the colonies is almost as free as trade with France itself.

An account of the colonies of France will be found under the particular headings.

*Navigation.*—In 1886, 100,796 vessels of all descriptions were entered at French ports, having an aggregate tonnage of 18,490,692. Of this number, 79,112, of 9,994,889 tons, sailed under the French flag. The number of vessels cleared during the same year was 102,386, of 19,023,334 tons, of which 80,151, with a tonnage of 10,368,362, sailed under the French flag. In the French fisheries there were engaged in 1885, 85,915 men, with 23,877 vessels. The value of the fishery product was 51,469,080 francs. In January, 1887, the mercantile navy consisted of 14,100 sailing vessels and 951 steamers. The former had a tonnage of 492,807, with a crew of 74,129 men; the latter's tonnage amounted to 500,484 tons, and the men employed numbered 12,790.

*Postal and Telegraph Service.*—The number of letters and postal cards forwarded in 1885 was 679,145,983; of journals, 413,981,338; of samples, circulars, etc., 433,024,137.

On January 1, 1885, there were 86,868 kilometers of telegraph lines, with 258,202 kilometers of wire. In 1885 were sent 23,091,360 telegraph messages, 21,150,444 of which were inland, and 1,940,916 foreign.

The postal and telegraph receipts in 1885 were 166,578,653 francs, and the expenses 134,424,235 francs. The telegraphs have been worked at a loss to the treasury ever since the government telegraph service was established in 1851.

The foreign trade is for a great part carried on by sea. France, however, has a very limited number of trading vessels; and foreign ships, chiefly English, convey about two-thirds of her goods, both imports and exports.

Besides the two banking companies especially founded with a view to assist agriculture, of which notice has been taken under that heading (*crédit foncier, crédit mobilier*), there are other establishments of credit which partake of the nature of public institutions, and must not be passed over in silence when speaking of French trade. The first of them is the *Banque de France*, founded in the year VII. (1799), and definitely organized by the law of April 26, 1806, which gives the management of the bank to a governor and two deputy governors appointed by the chief of the state, and assisted by a council of fifteen *régents* and three *censeurs* elected by the shareholders. The capital of the Bank of France is 182,500,000 francs. Besides issuing bank notes, which circulate as freely as gold, the bank has the power to discount bills and letters of exchange at three months, when indorsed by three signatures; to collect bills payable given to it by private persons or commercial houses for that purpose; to receive deposits and open current accounts; and to keep in trust the coupons, deeds, silver and gold bars, bullion, and jewels which may be intrusted to it, at the rate of 1 per cent. per annum. The Bank of France has now a branch in each department. This establishment is the great instrument of credit in the country. It has more than once supported the government by loans in difficult circumstances. The government, which

holds a great number of its shares, is therefore interested in its preservation, and, when money is unusually scarce, gives to its notes the value and privileges of coin, by decreeing what is called the *cours forcé*. This measure was resorted to during the late war, and confidence in the bank remained unshaken. During the year 1876 the quotation of the shares of the Bank of France fluctuated between 3,875 and 3,470 francs. Of other banks the *Comptoir d'Escompte*, which dates from 1848, and was reorganized in 1854, the *Société générale de Crédit industriel et commercial*, founded in 1859 after the model of the London joint stock banks, the *Société générale pour favoriser le développement du Commerce et de l'Industrie en France*, established in 1864, whose special feature is to endeavor to make the use of checks popular in France, and the *Caisse des Dépôts et Comptes-courants*, are also worth mentioning. Among the local banks, the *Crédit Lyonnais*, the Colonial Banks, and the Bank of Algeria may be named as the most important.

The coining of money is carried on by private contractors under the strict superintendence of the state. There are now in France six *hôtels des monnaies* (mints) in Marseilles, Bordeaux, Lille, Lyons, Paris and Rouen, respectively.—Paris is the chief center, and the other mints hardly now issue anything except copper coins.

*Early History.*—The extinct tribes which once thinly peopled the soil of France have left but scanty traces of their existence in the weapons and ornaments dug out of gravel-beds and river courses. However interesting they may be to the student of ethnology and of the origin of man, they find no place in history; for neither in blood, nor manners, nor speech have they left any mark on the land they inhabited. Very different are those tribes whom Cæsar met when he first entered Gaul. The history of France may well begin with the words which open his famous chronicle—"All Gaul is divided into three parts."

Of the inhabitants of these divisions, the Belgians, Gauls, and Iberians, the third were in all ways different from the others; for the Iberians were a race of other origin, shorter, darker of complexion, less sociable, less bright, of more tenacity, possessed of that power of resistance which those whom stronger races drive out of the plains into the mountains quickly learn. On the northward and southward slopes of the Pyrenees, amid the fastnesses of that great chain, and in the Basque provinces of Spain, this race still dwells, easily discerned by characteristics of speech and appearance, which mark them off alike from Spaniards and Frenchmen.

The Belgians and the Gauls were blood-relations. The former, dwelling chiefly in the northern districts of France, were later comers than their kinsmen the Gauls, stronger men and of a finer development. The Gauls, the men of central France, were a bright intelligent people, full of vivacity, frank and open of disposition, brave and scornful of tactics, as though all strategy were a lie and disgrace. The Belgians seem to have been more staid, less active, less easily cast down, more thoughtful; they were not without a physical and moral resemblance to their neighbors and distant cousins, the Germans. From these two tribes has sprung the modern Frenchman, who to this day, according to his part of France, bears the mark and sign of one or other origin.

When Julius Cæsar entered Gaul (58 B.C.), he found these natives in a half-barbarous state, split up into clans, each with its elected chieftain, its Druids or priests, and its body of warriors or horsemen; while below these was an undistinguished company of servile men, women, and children, who did all works of peace



for their idle fighting aristocracy. Each clan lived to itself, with little or no power of combining even with its nearest neighbors. Its home was usually an open village of circular wattled huts, with one family dwelling in each hut. Sometimes, in places of strength and importance, the Gaul built himself a fortified town inclosed by earthworks, perched sometimes, like Alesia, on a strong hill-top, or intrenched in dark recesses of wood and marsh. The more close the tightening of the Celtic clanship, the more completely did each little community live to itself, apart from other clans; so that in spite of the great difficulties of the country, Cæsar found the reduction of it a tolerably easy task.

Before Cæsar's day Gaul had already known something of foreign invasion. On her northern and eastern frontiers were the Germans; in the south stood the Greek city of Massilia, the ancient rival of Carthage; and in 122 B.C. Caius Sextius had founded the town which bore his name, Aquæ Sextiæ, now Aix in Provence, whence, as from a center, the Roman occupation spread through the district watered by the Rhone and its tributaries, until it received the name of Gallia Braccata, and became a province of the republic. Narbonne (Narbo Martius, founded 118 B.C.) was the new capital of the district, the first Roman municipium on the soil of Gaul. But invasion took an entirely new character when Cæsar was made proconsul, (59 B.C.) He entered on his great conquest in the following year, and the reduction of the whole country was complete by 50 B.C. In the course of those years the great Roman penetrated to the utmost limits of Gaul, beat down all opposition, crushed the Helvetians back into their Swiss home; he defeated the Germans who had made secure lodgment in the Sequanian lands, and drove them into the Rhine; broke the resistance of the Nervii, all but exterminating that gallant tribe; severed the connection between Gaul and Britain, on which the Armoricans especially relied, by two expeditions across the Channel, in which he gained a great addition of glory, if little fresh power; the conquest of far-off Britain fired the imagination of men; finally he brought the long wars to a close by the submission of Vercingetorix under the walls of Alesia.

Thenceforward Cæsar, having conquered the Gauls, became their emperor. He saw what boundless supplies of force, of enthusiasm and intelligence, were now at his disposal; with Gallic support and his own devoted legions, he was now able to give law to Rome herself. Meanwhile, he did all in his power for Gaul—lightened her tribute, mitigated slavery, forbade human sacrifices, repressed the Druids. The country lost its independence, and became the docile pupil and follower of Roman civilized life.

For more than four hundred years the Roman domination influenced Gaul. At the beginning of the time the natives were savages, dwelling in a wild land of forests and wastes, a thinly scattered company of unsocialable clans, without towns or roads or industries; at the end they had fine cities, and much cultivated land, wore the Roman dress, had adopted the Roman law, and had exchanged their own tongue for a new form of the common Latin language.

After the murder of Julius Cæsar, the administrative genius of Augustus found wide scope for its activity in Gaul. Lyons was the new capital, whence his four great roadways and his civilization radiated out in every direction. Several of the later emperors vied with him in their interest in Gallic affairs; Caligula spent much time in Lyons, and, in his grotesque way, encouraged letters there; Claudius was a native of that city, and threw open the senate to the Gallic chiefs; he established schools, emancipated slaves, and taught the Gauls the equality of all men under the law; Nero, with his

Greek sympathies, delighted in Provence, though he cared little for the rest of the country—then called "Imperial" Gaul. All through this period new ideas, new pleasures and efforts, characterized the life of Gaul; and after the fall of Civilis in 70 A.D., no one in all the country dreamed of any further struggle in behalf of the independence she had finally lost.

All things were now preparing for the next great influence which should affect the Gallic race. For nearly a century, though Gaul and Rome seemed together to tread the downward path toward ruin, the Roman ideas as to justice, law, and order, were fitting the Gallic mind for the reception of Christianity. And Christianity soon came. In 160 or 161 A.D. we find a bishop of Lyons, Pothinus, and with him the well-known name of Irenæus. These men ministered at first to Greek and other settlers, for the early church of Lyons long bore marks of a Greek not a Latin origin. Gradually, however, the life-giving ideas and doctrines of Christianity spread abroad among the Gauls, and churches sprang up at Autun, Dijon, Besançon, and other towns within comparatively easy reach of Lyons. Roman Christendom, however, did little for Gaul till the middle of the third century (244 A.D.), when seven Latin bishops were sent thither, and formed new centers of Christian life in the land at Limoges, Tours, and even Paris, whither came Dionysius with a little company of brethren in 251. Henceforward Christianity spread swiftly; and though in the next century St. Martin of Tours still found heathen temples to overthrow and multitudes of country pagans to convert, still we may say generally that in three generations from the time of the Roman mission of 244 A.D. all Gaul had embraced the Christian faith.

These were also the days of what is called "the Gallo-Roman empire;" of the provincial emperors who strove to sever the Eastern from the Western world. Along her northern frontier also Gaul saw the establishment of the two Germanies, districts on the left bank of the Rhine, where German warriors held their lands by feudal tenure of the sword. Thus as Gaul herself languished under the loss of her independence and the influence of the moral corruption of Rome, she began to become aware of the two powers which were destined to mold her character—the Christian Church and the fierce Germans. They advance upon her from south and north; when they meet, the Gaul bows the head before them, and in new union the feudalism of the Teuton and the Christianity of the Latins begin their task of education. The combination of the institutions of Germany with those of the church forms the basis on which the history of France is reared.

The Germans, who now began to overrun the soil of Gaul, were a very different race from those with whom they came into contact. Stronger and larger in frame, they were also more stable and enduring than the Gauls. Far back they claimed the same ancestry; in language and in personal characteristics alike we can trace the connection. Yet, thanks to climate and circumstances, the two races were by this time completely severed, alien in speech, ideas, institutions and tastes. The German was a hunter, a man of independence of character; the Gaul lived in his clan, and shrank from personal freedom; slaves were unknown in Germany, while they swarmed in Gaul; the Gaul had an organized faith, a regular hierarchy between him and the supernatural; the German worshiped, independent and alone, without human mediator, in the depths of his forests. The fighting-men who grouped themselves round a German chief were his free comrades, connected with him only by a personal tie, each prepared to act independently if his time came, and to build up for himself a lordship of



his own. On many sides these men now began to press into Gaul. The Goths, after wandering apparently from Scandinavia to the Black Sea, and thence into western Europe, settled down — the Ostrogoths in Italy, the Visigoths in Spain and southern France. The Burgundian Vandals, from Low Germany about the Elbe and Vistula, now began to stream over into eastern Gaul, giving their name to a large district of the country; the Franks, an aggregate of northern tribes, Low Germans of the center and the west, were destined to be the chief conquerors of the land, the authors of her modern name.

But before the German had become master of Gaul, the Christian Church had already firmly established itself. Thanks to the support he received from Christianized Gaul, Constantine was enabled (312 A.D.) to enter Rome in triumph, and to assure the victory to the church in her struggle against paganism. Henceforth the church, which had always endeavored in her organization to copy the civil power, was officially modeled on the lay institutions of the later empire; her diocese corresponded in position and extent to those of the civil administration; the chief clergy became important magistrates. The bishop of each city, with his clergy, took the place of the older curials, the members of the civil municipality; the old relations of church and state were profoundly modified by the rise of the bishop of Rome to the position of supreme pontiff, a title given up by the emperor. In the downfall of Roman society in the fourth century, the clergy alone retained some power, and showed promise of the future. The lay power struggled hard for a while against the German invasion, specially against the Franks; the church staid in the cities, secure and growing stronger against the day when she, too, would have to face the invader, and to convert him from a heathen foe into a firm ally and friend.

In the fifth century the Germans ceased to plunder and ravage, and began to settle; it is the age in which Gaul exchanges her Latin for her Teutonic masters. Early in the century a vast horde crossed the Rhine on the ice in mid-winter, and streamed over northern, central, even southern Gaul, passing thence a little later into Spain. In 412 Ataulf, the Visigoth, settled down in the valley of the Rhone, and allied himself with Rome; the Burgundians also occupied the Sequanian lands. These two tribes were friendly toward the older inhabitants, and were recognized as peaceable settlers by the imperial power; they showed that they deserved well of the falling empire by the gallant and successful resistance with which, in 450, the Visigoths and Gallo-Romans defeated the terrible hordes of Attila at Chalons-sur-Marne. Yet the empire thus saved for a time could not be saved from internal decay; confusion reigned throughout Gaul, the Germans and the Gallo-Romans struggling as it were in the dark for possession; and when, in 476, the empire of the West finally went under, Ewarik (or Euric), the prudent Visigoth, was left as master of all that had belonged to Rome beyond the Alps toward the west. The Arian Goths, with Toulouse as their capital, might have secured their authority over all France if the church had accepted the views of Ewarik, and if that vigorous prince had lived. He died, however, in 485, leaving behind him only a weak boy as his successor; and far to the north the fierce Frankish warriors had already taken as their chief the youthful Hlodowig (Clovis). The Franks, a loose confederation of Germanic tribes, were in existence in the third century on the right bank of the Rhine, and for a long time showed no wish to migrate into Gaul. By degrees one of these tribes, the Salians, headed by a family called the Merewings or Merwings (the Merovingians), began to take the lead; they soon made

themselves formidable by their incursions on northern Gaul, and established themselves masters of the left bank of the lower Rhine. As the Roman power declined along that district, their authority increased; early in the fifth century they had spread from the Rhine to the Somme. Another leading tribe of Franks, the Ripuarians, whose home lay on the Rhine about Cologne, less tempted toward Gaul, seemed to hold themselves in reserve for the future.

In 481 Hilderic, chief of the Salian Franks, died, leaving behind him a boy of fifteen, Hlodowig or Clovis. This youth, endowed with unusual vigor and fierceness, soon won a great reputation among the Franks, and in 486 broke in on the only Roman power now left in northern Gaul, the degenerate legions commanded by the patrician Syagrius of Soissons. These were swept away like the autumn leaves before the wind, and Hlodowig settled down in the lands which he had won. Here he at once came into contact with Christianity; Remigius bishop of Rheims becoming his friend and adviser long before he adopted the Christian faith. It was probably through his influence that the young king married Hlotchild, niece of the Burgundian king, a Christian maiden. In the quiet years which followed, Hlodowig doubtless became more and more inclined toward his wife's belief; and when, in repelling the invasion of the Allemanni in 496 he believed that the "god of Hlotchild" had heard his vow, he at once declared his gratitude and his conversion. Some thousands of his wild warriors followed him to the font, as willingly and with as little thought as they would have followed him to death or victory. From this moment the firm alliance between the church and the Frank began, an alliance which affected both; the church became more warlike and aggressive, the Frank grew more civilized, and learned the art of ruling.

With their headquarters fixed in northern Gaul, the Franks, under Hlodowig's command, reduced first their cousins the Burgundians (500 A.D.) and then (507) the Visigoths under Alaric. All France, with exception of a rich strip of land between the mountains and the Gulf of Lyons, afterward called Septimania, was overrun and plundered. This done, Hlodowig spent the rest of his days securing his dominion by the destruction of all powerful neighbors or competitors; for the grim Frank, vigorous and ambitious, knew neither scruple nor pity, and the clergy round his throne passed over crimes which they were powerless to prevent. When he died in 511 the settlement of the German on the soil of Gaul had been accomplished, and Hlodowig, who has no claim to honor as a man of constructive power still stands out in history as the founder of a new world in France. To him France owes that feudal relation which has so deeply marked her story; in him the church first made that connection with feudalism, which lowered her character, while it strengthened her power and influence. Not without reason does France inscribe on the first page of her history this German conqueror, a robber, a liar, a murderer,—for it is from him that modern France rightly dates her beginning.

The origins of feudalism are simple enough. When the Franks came in under Hlodowig, they were a host of free and equal Germans under the king of their choice. The belief that he brought with him a graduated hierarchy of chieftains, who at once established a complete "feudal system" on the conquered soil is no longer tenable. No doubt the most influential and vigorous of Hlodowig's followers got most in the distribution of lands and spoils; still, in theory at least, all free Franks were equal, and in the new settlement of the country each man, according to his strength, took what he could get. The older conditions of the Germanic peoples had



died out of the Salian's life; the institutions which appear in an indistinct form in the *Germania* of Tacitus had already undergone great change; the family of tribes, with common rule of usage and very slight bonds of political union, is, as Professor Stubbs remarks (*Constitutional History*, i. p. 36), "singularly capable of entering into new combinations; singularly liable to be united and dissolved in short-lived confederations." It was one of their late-formed confederacies over which Hlodowig, with the vigor of barbarous youth, had now come to rule. The Salian law, a collection of the customs of Frankish law in the fifth century, gives us a fairly clear view of the condition of those who streamed over into Gaul at this great chieftain's back. We learn from it that among the Franks the kingly office was fully recognized, and though the form of election by the nation is preserved, the choice is limited to the members of a single family, so that hereditary succession partly prevails. The king, once chosen, is the real head of the nation; he has not as yet run any risk of becoming a *fainéant*; he appoints the rulers of provinces, if we may use this Roman term—that is, the *grafs* who are set over certain aggregations of hundreds; and the *graf* or reeve, to take the English form of the word, is an administrative officer, who carries out the sentences of the courts of justice. The king also appoints the officers who collect the royal dues in the "vills" which had succeeded in the place of the primitive "marks" of the Germanic peoples. Round the king's person is his "comitatus," his aggregate of immediate followers, who form his guard, and are the germ of the later feudal nobility. The nation in arms forms the equal council, in which all men give voice and vote alike; justice is administered by a hundred-court or *mail*, composed of qualified land-owners; if any one is aggrieved by their decision, he can appeal directly to the king. It is round this "hundred" that the Frankish system really moves, for it is out of a group of hundreds that a district with its *graf* is formed; and there seems to be no court of law superior to that of the hundred. All political questions are, of course, the affair of the national council. There is in the Salian law no trace of a primitive nobility; though the old system of common land has disappeared, giving place to separate ownership, the land does not carry with it any special honor; the Franks are still very far from any ideas as to a territorial nobility.

These were the institutions which Hlodowig transplanted out of the district of the lower Rhine into Gaul. They came into contact with the tenacious Gallic temper, and the masterful organization of the Romans. The Franks, with singular energy and success, adapted themselves to their new place as conquerors; and, giving and taking, laid the foundations of modern French life. Their settlement was slow and unsystematic; the king, receiving a large portion of the soil as his domain, granted out of it benefices for his immediate friends and followers. These gifts were at first held on pleasure, and were liable to be resumed at any time; after a while this precarious tenure suited neither party; these fiefs became first life-holdings, and finally hereditary possessions, held on tenure of service of some kind. The greater chiefs, with the king, took their share of conquered lands, asserting their rights to an allodial holding, and, if they chose to do so, granting out benefices from these districts to their followers. The common sort of Franks, who were neither king's friends nor independent chiefs and their friends, took what they could get, their share of the spoil as it fell to them; and as their strong arms were useful and marketable possessions, we may be sure that many of them grouped themselves round the king, and, if they were fortunate, were rewarded with small benefices. A considerable

part of the land was left in the hands of the Gallo-Romans undisturbed, and became tributary—the tribute being a kind of rent paid by the old owners to their new masters.

Thus the Franks were spread over the whole surface of the soil; they were at home in the country, and shunned the cities; civic life was distasteful to them; the air of the streets too confined for those who loved the forest and the chase as all Germans did. Consequently, in the towns the Gallo-Roman bishops retained sole authority, ruling by the Roman law, and preserving the last remains of the civilization of the past. The church, however, was far from confining herself within these civic limits; though she stood aloof from feudalism at first, deeming her own ways better, she soon showed a consciousness that the center of power no longer lay in the cities, and that her influence must be felt at the king's court. Consequently, we soon find the bishops grouping themselves round the king, acting as his advisers, modifying the Germanic ideas, and in turn receiving new ambitions from their masters. Ere long the bishops will begin to take place in the feudal hierarchy, and will form a recognized part of the new nobility of the realm; though for a very long time the Franks clearly regarded the clerical life as unsuited to their character, and left the influence and fortunes of the church entirely in Gallo-Roman hands.

Before Hlodowig died (511) he had destroyed all the old chieftains and knights who ruled in Gaul. He took the place of Roman and Goth; the Visigoth shrank away southward; the Burgundian became tributary; the Frank was recognized as undisputed master of all the country; the northern barrier lines between Gaul and Germany perished; as fresh bands of Franks poured into northern France from time to time, the Austrasian princes renewed the Germanic influences over Gaul; and for five centuries the history of France must be regarded as in most respects subordinate to that of Germany.

Germanic use prevailed in the new kingdom, and when Hlodowig was gone, his four sons all became kings, each representing one of the divisions of the original invasion. Theodorik, the eldest, took the northeastern part, and became king of what ere long began to be called Austrasia; he lay on both banks of the Rhine, and was almost entirely German, with his capital at Metz. Hildebert, eldest son of Hlotchild, had the central district, the country round Paris, with Paris as his capital. Hlodowig, the next, was king of Orleans, and had western Gaul along the Loire. The youngest, Hlothar, was king over the old Salian land, the northwestern corner of Gaul, with his capital at Soissons. The partition was a division of estates rather than of governments; the four kings regarded the country north of the Loire as their home, and divided out all beyond that river at will by arbitrary lines. As yet a king was little more than a leader in war, and his free men, his "leudes," looked to him to give them plentiful employment in that way, even compelling him at times to go on expeditions against his own better judgment. Thus it fell out that this first partition did not weaken the Franks; they attacked their neighbors on every hand. In one of these wars (in 524) Hlodowig, king of Orleans, was killed; his brothers seized his inheritance, and on Hildebert's death (558) Hlothar of Soissons became sole king of the Franks; in 555 he had taken possession of Austrasia. Hlothar's rule brings the name of Neustria into prominence. The two branches of the Frankish power become clearly distinguishable,—the German Austrasians coming down to Lorraine, and including the eastern part of Champagne, as these districts were later called, and the Gallic Neustria cover-



ing almost all modern France. And Neustria settled quickly into a monarchy of more modern type. Round Hlothar were grouped his reeves or counts; the clergy made their court to him; the "leudes" now become the king's "trusty men;" not a few Gallo-Romans also held office under him.

On Hlothar's death (561) the Frankish kingdom was once more divided into four parts—Austrasia, Paris, Soissons and Burgundy,—the eldest son, Sigebert (as in the earlier partition), taking the northeastern country. When Haribert, king of Paris, died in 567, Hilperik, his brother, king of Soissons, seized his share, and became king of Neustria. And now the three Frankish kingdoms of Austrasia, Neustria and Burgundy take definite forms. Speaking generally, Austrasia lay between the Meuse and the Rhine, Neustria between the Meuse and the Loire, though Austrasia trenched somewhat on Neustria on one hand, and stretched far up even beyond the Rhine on the other side. Burgundy included the upper waters of these rivers, and of the Saone as well. The rivalry lay between the Austrasians and the Neustrians; the Burgundians, being the weakest and most peaceful of the three, sided sometimes with the one, sometimes with the other. This rivalry finds its expression in the half-legendary strife between the haughty high-born Brunhild, wife of Sigebert, king of Austrasia, and Fredegond, the low-born mistress of Hilperik, king of Neustria.

Before the end of the sixth century we discern a new power rising into distinctness—the power of the mayor of the palace, an officer, as his name denoted, having great authority in the king's court, elected by the chiefs, and acting almost independently of his master. In Neustria we usually find the mayor of the palace siding with the royal power; in Austrasia, where the nobility were much stronger, he checks and overshadows the king; in Burgundy he is only an insignificant person, being of inferior importance to the patrician, whose office, as the name tells us, was a relic of past Roman days. Another, and far more beneficial influence, also appeared at this time; the Benedictines came across from Italy, and spreading throughout France, formed many centers of fresh life in the confusion of the land. They revived the faith in industry, well-nigh destroyed by the Franks; they did something to rescue the older inhabitants from misery; and culture and letters, thanks to their well-directed energies, again raised their heads.

At the end of the century the two queens, Brunhild and Fredegond, were the two rulers of all the country; for Brunhild had charge of her two grandsons, Theodebert II., king of Austrasia, and Theodoric II., king of Burgundy, while Fredegond governed Neustria for the youthful Hlothar II. So early does the extraordinary prominence of regency appear in French history. After Fredegond's death in 598, Brunhild seized on almost the whole of Neustria, and for a while seemed once more to unite the Merwing lordship under her rule. Her chief aim was the establishment of a solid monarchy in Austrasia, which should curb the power of the nobles; they, in opposition to her, placed at their head two brothers, Arnulf, bishop of Metz, and Pippin of Landen, the ancestor of that great family under the auspices of which modern society laid its foundations in both Germany and France, the great Karling or Carolingian dynasty. Led by these two men, heads of the lay and spiritual aristocracies, the Austrasian nobles met the aged queen; her army deserted her, leaving her with her four great-grandchildren in the hands of Hlothar II., the nominal chief. He put the children to death at once, and after shameful indignities, the queen, it is said, was tied to the heels of a wild horse and so dashed to pieces. Her death was a triumph of aristocracy over

monarchy. Hlothar II., now sole king of Franks, was entirely in the hands of the mayor of the palace, who became a real power in the state, representing the interests of the nobles as against the centralizing tendencies of the kings.

This victory of Neustria, though it paved the way for the eventual domination of the Carolings, was, in itself, "the triumph of weakness over strength, of the Gallo-Romans and the priests" (Sismondi). The victorious nobles endeavored to secure their supremacy. The bishops, who were now found sitting in the assembly of the "leudes," drew up a new ordinance, a "perpetual constitution," a first attempt to substitute ideas of justice in the place of custom based on force. This, however, in the nature of things, could not check the growing power of the nobles, especially in Austrasia; though for a time royalty, under Dagobert (628-638) showed a good front in Neustria. In him the Merwing monarchy reached its highest point; his splendid court at Paris laid the foundations, not altogether sound ones, of the civilization of France. At his death his monarchy crumbled away. Children were kings in both Austrasia and Neustria; we reach the days of the "do-naught" princes, the *rois fainéants*, and of the struggle between the mayors of Austrasia and Neustria. Ebroin, the Neustrian, for a time held out against his rivals; but the Austrasians placed at their head the representatives of the Caroling family, Martin and Pippin, grandsons of Pippin of Landen; and, Ebroin having been assassinated, Neustria had nothing wherewith to resist the onslaught of the German Franks. Led by Pippin of Heristal, they burst into the valley of the Seine, and at Testry in the Vermandois, the long struggle of the two Frankish powers came at last to an end (687). There the Neustrians under Berthar, mayor of the palace to Theodoric III., were entirely defeated, and, henceforth, though the line of Merwing kings lasts till 752, they become insignificant and powerless. We turn our eyes with pleasure toward the rising splendor of the Caroling house. France finds herself on the skirts of a new Roman empire, of which the seat is in Germany, and which in its main features belongs to German not to French history.

To no small extent the Neustrian Franks had lost their old Germanic vigor before this time; perhaps among the chief symptoms of change is the fact that many Frankish names may be read among the upper clergy of the time. In the absence of sufficient evidence it is impossible to say how far they had condescended to learn the "rustic Latin" which the older inhabitants all spoke, the parent of the modern French language; still, there can be no doubt that they must have spoken it to some extent, if not as their sole speech. Now, however, the Austrasian conquerors began to bring things back to a German form. The ancient "Fields of March" are held again; thither come the warriors in arms as of old; German conceptions as to justice seem again to prevail over the more orderly Roman law. The newcomers are above all things an army, and it is the fortune of the Austrasians, not only that they have soldiers and love fighting, but they have great captains at their head. From Testry (687) to the end of his life in 714, Pippin of Heristal was unquestioned master of all Franks, the kings under him being utterly insignificant. While he kept his Neustrian subjects submissive, he applied the enthusiasms of the sword and the cross to the wild Germans on his eastern border. Under him began the heroic labors of those English monks whose is the high honor of having first introduced the Christian faith among the pagan Teutons.

On Pippin's death things seemed likely to fall back into confusion; the Neustrians shook off the yoke of



their German lords, and Austrasia was at once threatened from every side; Frisians and Saxons, as well as Neustrian Franks, overran the country, vainly opposed by Pippin's widow, Plectrude, who ruled in the name of her grandson, a child. Austrasia, however, was saved by the energy of Pippin's natural son Charles, whom Plectrude had thrown into prison, and who now emerged as a strong leader of nobles. He defeated the Neustrians at Vincy, near Cambrai, in 717, repelled the Saxons from the Rhine, reduced Plectrude, who had taken refuge at Cologne, and became undoubted head of the Franks, as his father had been before him. His father's rise had been the work of the lay and spiritual nobility; the power of Charles was based on the sword alone; he was regarded by the churchmen as their foe; he took of their lands to reward his soldiers, punishing the noble bishops while he encouraged the more popular monks. Though the clergy treated his memory with vindictive anger, the lay lords were firm on his side, and enabled him to found the great dynasty of the Carolings. For it was their ready sword that won him the victory of Poitiers (or Tours), in which Europe set a limit to the advance of Asia, in 732. The Arabs, possessors of almost the whole of Spain, had for several years poured over the Pyrenees into southern Gaul; held in check awhile by the vigorous Odo (or Eudes) king of Aquitaine, they proved at last too strong for him, and he appealed to Charles to rescue him. The Franks responded nobly to the call, and in a few years Charles had driven the Saracens out of all their points of vantage north of the Pyrenees. It is said that to the battle of Poitiers Charles owes his name of "Martel," the Hammer, for his vigor with which he smote the Mussulmans. Other accounts have been given of the sobriquet; on the whole, the common explanation of it is the most probable and the best supported. All the rest of his life this great duke of the Franks struggled against the pertinacious foes who attacked his frontiers. His power may be said to have been limited by the Rhine to the north and east, and by the Loire to the south.

Just before his death he divided his dukedom between his sons Carloman and Pippin the Short. As usual, the elder had the Germanic share, but under the influence of Boniface, the English monk and missionary, whom he made archbishop of Mainz, he, after six years of successful rule, laid down the burden of power and became a Benedictine monk. His ducal rights he handed over to his brother Pippin, who had become sole duke of the Franks. His father and brother had opposed the power of the bishops by the help of the monks; it remained for Pippin to go a step further, and linking together the monks with the papacy, to win for himself the name of king. The monks had been the papal militia for the conversion of Germans; the converted Germans in their turn became firm friends of the Frankish dukes. The head of the whole movement was St. Boniface, the founder of the church in Germany; he it was who, acting under command of Pope Zachary, crowned Pippin king of Franks in the cathedral at Soissons. Pippin thereby became lord by a new title of the eastern and western Francia, or Frank-land, ruling over a large part of modern Germany and of modern France, north of the Loire at least. The last of the Merwing shadow-kings, Hilderik III., was deposed, and thrust into the convent of St. Omer, where he shortly after died, and the race became extinct. On three sides Pippin was called to combat three powers, foes of his new royalty, foes also of the Church of Rome. The pagan Saxons did not detain him long; in one campaign he extorted from them the right to send his monks among them as missionaries; the rest he left

to time. The Lombards, under their king Haistulf (Adolphus), had seized Ravenna, and threatened Rome herself, and Pope Stephen fled to Pippin for help. The Frank king crossed the Alps, and compelled Haistulf to give up to the Church of Rome the town of Ravenna, the Emilia, the Pentapolis, and the duchy of Rome itself. This is the famous "Donation of Pippin," the foundation of that temporal power of the papacy the end of which we have seen with our own eyes. The papacy raised up the Franks as their champions and defenders; they were set as a counterpoise to the grand claims of the empire at Constantinople, and as antagonists to enemies in Italy. No wonder if before long the papacy saw its advantage in the restoration of an empire of the West under new auspices, and if Germany in return willingly interfered in the affairs of Italy. The political life of modern Europe now begins. The rest of Pippin's reign was chiefly occupied with the resistance he found in southern Gaul. In 758 he took Narbonne, the capital of the Arabs, and drove the Mahometans out; he attacked the Aquitanians, who, after their wont, made tenacious resistance. On the death of their duke Waiffer, he overran their whole country, though he never occupied it permanently. Centuries must elapse before northern and southern Gaul could become one France.

In 768 Pippin died at Paris, leaving his dominions to his two sons Charles and Carloman. In 771 Carloman also died, and Charles became sole king of Franks. The reign of "Charlemagne" is begun, the great German lord who in fact and legend filled all the world. The seat of his father's power lay, on the whole, in Neustria, and his chief struggles had been for dominion over Aquitaine; the seat of the power of Charles himself lay on or near the Rhine; his three chief palaces were at Engelenheim, Aix-la-Chapelle, and Nimwegen. His whole temper, history, relations, were strictly German; the part played in his life by Neustria and Aquitaine was, by comparison, insignificant, for Charles the Great belongs to world's history, not to the history of France.

His first task after his father's death was to complete the reduction of Aquitaine; for here war had broken out again when Pippin's death seemed to the southerners to give them their opportunity. Charles beat the old Duke Hunold in the field, and drove him to take refuge with the Lombards, where some time later he fell, helping to defend Verona against his and their hereditary foe. The struggle in Aquitaine, hopeless if vexatious, lingered on, until at last the wise king, as imperial ideas grew stronger in him, saw that his one hope of success with them lay in giving them an independent life of their own, under due restrictions. He therefore set over them his little son Hlodowig as king, and appointed William Courtnez, count of Toulouse, as his tutor. The child was established at Toulouse, and brought up as an Aquitanian. The south retained its distinctive characteristics, and was saved from the degradation of having to fall back to the lower level in art and civilization which prevailed among the Franks. The kingdom of Aquitaine had for its southern frontier the river Ebro in Spain, and crossing the mountains reached the open sea just below Bayonne; the northern frontier at first was less well defined; before the end of the eighth century it was pushed on as far as to the Loire.

And just as Hlodowig was established in Aquitaine, so in 776 Charles set his second son Pippin over the Lombards, thereby securing his permanent influence over the see of Rome. The papacy throughout leaned on him for support, and was even content to recognize his supremacy. For a quarter of a century Charles' life was spent in ceaseless wars on every side, in which



he slowly though surely beat down the resistance of heathen Saxons, of Huns, of Lombards, of Saracens. Within the limits of modern France, after the pacification of Aquitaine, the only war was that against the Armoricans, inhabitants of Brittany—a slow stubborn contest, which lasted till near the end of his life. For a short time Brittany became a portion of the empire, without, however, in the least losing any part of its independent character.

By 796 Charles had secured his ascendancy throughout Europe, so that when in 799 Pope Leo III. was ejected from Rome by the citizens, he fled to him for refuge and help; and Charles in the autumn of 800 replaced him on the pontifical throne, receiving in return, on Christmas day, the solemn titles of Emperor of the Romans, Augustus; and certainly, if ever the great echoes of the past were to be awakened, they could not have been aroused for a worthier prince. "A Latin priest gave to a German soldier the name of that which had ceased to exist," says La Vallée. None the less was Charles a real emperor, ruling over subject princes; the Germans and the Romance peoples alike accepted his sway; and for fourteen years, with less of fighting and more of organization, Charles the Great proved that he was worthy of his high title and revived office of Emperor of the West. In 806 at Thionville he settled the succession to his empire; but as death bereft him of his eldest son Charles and his secondson Pippin, he was obliged in 813 to make a fresh arrangement. He made Hlodowig, the one surviving son of his second wife Hildegond, his heir and successor, crowned him, and saw him saluted emperor. After this, he lingered a few months, and died early in 814 at Aix-la-Chapelle. It was doubtful whether he should be buried there or at St. Denis, where his parents' bones had been laid. Austrasia, however, prevailed over Neustria, the Germans over the Frenchmen, and he lies at rest these thousand years past in the church he himself had built in the city he loved so well.

The state of what is now France under his care was this. The land was cut asunder at the Loire; to the north of that river was *Francia Occidentalis*, the earlier Neustria and Burgundy; to the south of the Loire lay Hlodowig's kingdom of Aquitaine, governed by Roman law, and home of precious remains of Roman culture. In *Francia Occidentalis* were Frankish nobles, the clergy, the free Franks, the inhabitants of cities, and the slaves, the last in ever-growing numbers. The first and second of these classes soon began to secure their position as great feudal lords, half independent. They laid the foundations of that system of feudal noblesse which became almost omnipotent under the weaker Carolingian princes, which brought about the revolution placing Hugh Capet on the throne, which resisted the centralizing tendencies of the monarchy under Louis XI. and Louis XIII., which became the devout servants of the Great Monarch, and finally ended with the monarchy at the Revolution. The reign of Charles the Great is the time at which these nobles began to see that their strength was based on the land; their position grew more territorial, their allegiance and honors less personal. Charles endeavored to resist this tendency, but his hand could not be everywhere, and the nobles, on the whole, held their own, though so long as he lived they still bent before his power.

The administration of Gaul at this time was in appearance fairly complete, though it doubtless often failed in its practical application. Handed down from former days, in the larger towns there were always two chief personages, the count and the bishop, of whom the former officer was of Frankish origin, the latter of Roman. To a considerable extent, as was the case

throughout all early Christendom, the functions and jurisdiction of the bishops originally answered very closely to those of the lay power, the church organization being copied from the organization of the empire. Now, each of these greater officers had his own jurisdiction and court; each administered therein law, the bishop according to the Roman order, the count according to Frankish usage; and, though their functions might sometimes clash, on the whole they joined in preserving peace and quiet within the walls. The counts also attended the war force and collected the taxes, while the bishops, on their side, were charged with the teaching and the moral life of their flocks. Between them they preserved a considerable amount of municipal life and character in the ancient cities. Under the counts we find local officers, whose business it is to hold lesser courts in the bourgs and villages round about. These were the centeniers, or hundred-men; there were also here and there traces, as in England, of a lower division into decuries, or tythings; the counts had also their "vigueurs," their "viscounts," as they were afterward called, who represented them, and they also appointed (if the work were not done by the *Missi Dominici*, the imperial commissions) officers called *scabini* (*échevins*, or in German *Schöffen*), local judges who held lesser courts in country places. In addition to these courts, each chief and each considerable churchman held his own pleas; by these the condition of the free Franks, of the slaves, and of such persons as were still just above the servile state, was decided, all questions between them and those above them adjudged, with no very happy results in the main.

The emperor, honestly desiring, as far as he could, to arrest the downward progress of the feeble free Franks and of the still more wretched slaves, sent forth the above named *Missi Dominici* to travel through the different districts of the empire, and to see with their own eyes the state of the people. Usually they went out in pairs, a layman and an ecclesiastic, so that the secular and church courts and benefices should each be inspected by a man of the same order as the lord whom they visited. They traversed the districts assigned to them in circuit four times a year, held courts to which even the counts were bound to come, looked into the details of government, reformed gross abuses, reported to their master on all persons, even the highest, appointed when needed fresh *scabini* and others, removed unworthy persons, looked to the poor, protecting them as far as possible from want and want's kinsman, the oppressor. The great evil of the time was injustice defended by bribery; the local judges could not resist the powerful or wealthy ill-doer, and so the wrongs of the poor remained unredressed. The *Missi*, with more or less success, endeavored to lessen these evils. We may believe that in the main the clergy worked willingly with them; they had closer relations with and warmer sympathies for the poor folk; they administered a more stable and intelligent code of laws; they were the depositaries of learning, and desired to educate those around them; even in the worst times the humane morality of the Gospel gleams forth. In the days of Charles the Great all churchmen turned to the emperor and paid willing allegiance to him; the ancient political coolness between the Carolings and the episcopate entirely disappeared.

The elements of society in Gaul at this time may be easily summed up. There were great Frankish lords, gradually diminishing in numbers as they grew in power and territorial independence; there were great bishops, chiefly in the cities, and lordly abbots in country places, who were all by degrees becoming assimilated in condition to the Frankish nobles; there was also a rustic



clergy, whose state was poor in the extreme; then there were the free Franks, scarcely above the level of slaves, and ever slipping down into the servile class; then Gallo-Romans in much the same condition; and lastly the slaves, who are said to have formed nine-tenths of the population. The picture is one of great wretchedness, oppression, injustice; the great Charles himself felt no sure ground under his feet in dealing with the social condition of his subjects. It is clear that society must pass through vast changes before anything like an orderly and flourishing community could exist, and that even the splendid climate and soil of Gaul would long do little to better the condition of its inhabitants. The wretched period which comes to Gaul after the death of Charles is the time in which, from the older relations of chief, free Frank, and slave of war, we pass gradually and almost insensibly to the later feudal relation of lord and vassal and serf. The coming time was, as has been said by Hallam, "the age of the bishops;" but in fact the bishops were only doing in their sphere what the lay chiefs were also achieving in theirs — laying the foundations of a feudal independence which was forever striving to lapse into feudal anarchy.

On the death of Charles the Great, the eyes of all turned hopefully to his own surviving son, the gentle Hlodowig, Louis the Pious. His father had summoned him to Aix-la-Chapelle, had made him emperor, and then had sent him again to Aquitaine till his time should come. In him all sweet qualities of piety, morality, culture, seemed to find their home. His Aquitanian rule had brought with it untold blessing to the south; he, too, had learned their best lore, had become acquainted with their art, their poetry, above all with the Roman law; he was a man of thirty-five when he became emperor, vigorous, pure-souled, intelligent. Men thought that his father had done the rough-hewing of his great work, and that the new emperor would be the organizing Augustus following the creative Cæsar. His soul was full of high and conscientious aims; he would make reforms which should regenerate without weakening society; he would restore the clergy to high authority, would give full powers to the great lords, would save free Franks from slavery, and thus secure harmony and peace throughout his vast dominions. How different was the actual result! This noble prince, so dignified, earnest, right-minded, of "sound mind in sound body," gentle and simple, had all the dangerous virtues which grow to be calamities in rough times; his monkish tastes, his Christian forbearance, his want of an unscrupulous will, all pointed toward failure. Even within his house he was not master; and in the broad wild territories of the empire he was destined to a like failure. On the death of his first wife, Hermingond, who had borne him three sons, Hlothar, Pippin and Hludwig, he married Judith, daughter of Welf, the Bavarian, a dangerous and ambitious lady. Her son Charles, afterward styled "the Bald," brought the emperor many troubles, for the natural jealousies sprang up between the children of the first bed and the second wife and her son. War soon followed, in which personal ambitions were seconded by the ancient enmity between German and Gallic Franks. Struggle followed struggle, partition led to partition; there is no drearier piece of history than Nithard's short chronicle of those years. The unlucky Hlodowig was buffeted about, now deposed, then restored again; now bowing his head before the clergy of Roman France at Compiègne, now recalled to rule, as it seemed, by the unanimous voice of his sons and his subjects. The main result was the separation, which then began, of France from Germany. In the midst of it, Hlodowig the Pious died, in 840, and was buried at Metz.

His death was the signal for the final disruption of

the empire of Charles the Great. Hlothar, his eldest-born son, took the imperial name, and claimed supreme headship over the Franks. The Bavarian or German Hludwig, and Charles, who represented the Franks in France, both resisted; the Franks in Italy, Aquitaine, and Gothia, rallied to the emperor. War broke out at once. As soon as ever the Aquitanians had joined his forces Hlothar challenged his brothers to battle, and they at once accepted his wager. On the banks of the Cure, near Troyes, was fought the great battle of Fontanet, which brought the griefs of the age to a point. There the whole Frankish race struggled for the mastery. From Italy, Austrasia, Aquitaine, Gothia, came the emperor's supporters; Germany, Neustria, Burgundy, supported Charles and Hludwig. The carnage was terrible; Fontanet is the burial ground of the old Frankish life; free Franks are heard of no more; "there remained in Gaul only lords and serfs; all things are made ready for the increasing of feudalism." Hlothar was entirely defeated and fled northward to Aix-la-Chapelle; Charles and Bavarian Hludwig were masters of the field. When next year the two brothers found themselves once more menaced by the emperor, they met with all their forces at Strasburg, and took solemn oath each to the other, Hludwig swearing in the "Roman" tongue, the earliest French in existence, and Charles the Bald in the "Teudisc" or German; and the armies standing round them repeated the words, the German Franks in German, the Gallic Franks in French. The text of the oaths is preserved for us in Nithard; they are a striking evidence of the way in which Germany and France were asserting each its independent character. The "Romance tongue," the speech of the common people in France, their modification of the Latin they had learned long before, henceforth took the place of the Latin language on the one side, and of the native Germanic speech of the Franks on the other; henceforth the name of Frenchman may come into use.

As a result of this agreement between Charles and Hludwig, Hlothar was driven back to Aix-la-Chapelle. He thence fled to Lyons, to be near his southern friends; and, finally, finding himself completely overborne by their opposition, he made with them the famous treaty of Verdun in 843, in which three kingdoms were distinctly marked off:—France for Charles the Bald; Germany for Ludwig the Bavarian; for the emperor Italy and a long narrow strip lying between Germany and France, a conventional district, which a little later received from its lord, the second Hlothar, the conventional name of Lotharingia or Lorraine. Charles the Bald had for his kingdom all Gaul west of the Scheldt, the Meuse, the Saone, and Rhone; it ran down to the Mediterranean, and was thence bounded by the Pyrenees and the Atlantic. It included therefore the chief part of modern France. It was Charles the Bald also who allowed the county of Paris to become a part of the duchy of France, so that the dukes of France were also counts of Paris; from this question sprang eventually the decision of the momentous question as to what city should become the capital of modern France. In this manner the magnificent empire of Charles the Great came to an end, and in its place rose the nations of Europe. Speaking of the year 841, Nithard tells us that throughout the breadth of France the utmost confusion and rapine oppressed the people; in thirty years there had been five partitions of the Frankish empire, each marked with its own violence and misery; and the condition of the inhabitants, groaning under the ambitious foreign rule of quarrelsome princes, was as bad as well could be. The time, however, was now coming in which the greater lords of Neustria began to forget their German interests and nature, and to move toward



a national French life. At first their action was chiefly disruptive, aiming at a local territorial independence; lay lords and great bishops alike pushed their pretensions to the farthest point; hostile to the imperial ideas of Germany, they had no sympathy with any national ideas for France. Nor is this strange, for France can hardly in any sense be said to have existed in their day. We have reached the time in which feudalism emerges from its earliest stages, and strives to lay the foundations of its independence. From the Treaty of Verdun in 843 to the accession of Hugh Capet in 987, France passes through a dreary and confused period of formation.

Charles the Bald is a fit representative of such an age; he passed a long life sweeping together territories under his nominal sovereignty, and endeavoring to secure to himself the imperial dignity and the commanding position of his great namesake and grandfather; and though he was at the outset king of Neustria, his interests lay far more outside than inside France; the instincts and sympathies of Charles, as of all his family, were German. His schemes and struggles, rewarded in the end with apparent success—for just before his death he was crowned king of Italy and emperor—in reality were fatal to the Caroling dynasty. He bought his advancement first by subservience to the greater clergy, and afterward by granting to the feudal lords the charter of their independence. After the Treaty of Verdun had apparently given to Charles the Bald undisputed lordship over the western portion of the empire, three states still resisted his authority: Brittany, which, under Nomenoe, asserted and secured her independence; Septimania, which drove out his armies for a while; and Aquitaine, in which the vices of Pippin gave Charles a footing, and made a way to his success. For several years his whole energies were engaged in these bootless struggles, while at the same time his coasts were being ravaged by the Northmen. He was obliged to pay a heavy scot before he could deliver at one time the rich valley of the Somme, at another the walls of Paris herself, from their devastations. In a capitulary of 877, the last year of his reign, we have the levy of a contribution in order to buy them off from the Seine. In 855 the death of the emperor Hlothar was the signal for a fresh division of lands, in which Charles got his share in Lorraine and the kingdom of Provence. His fortunes, however, scarcely mended; overshadowed by nobles and bishops, his tenure of his kingly throne was ever precarious. The great lords, seeing in him a tendency toward resistance of their claims, called in German aid to dispossess him; and Ludwig the German came to their help. The inhabitants of Gaul, roused by the appearance on their soil of these German antagonists, rose and drove them back to the Rhine. Charles seized the opportunity of strengthening himself, as he hoped, by appealing to the church; the church by its spokesman, the great Hincmar of Rheims, replied by accepting the call, by declaring her authority over kings, and by tracing the lines of episcopal and royal power: "If kings rule after God's will, they are subject to none; if they be great sinners, then is their judgment in the hands of the bishops." Hincmar, in these words, stretched wide the rule by which the clergy had claimed to exercise judicial functions in the case of ordinary malefactors. And thus the clergy rewarded themselves for having saved Charles from the hands of the nobles and the Germans. The reins of power were now entirely left in Hincmar's hands, and the dreary capitularies of the reign bear evidence in every page of the overwhelming influence of the clergy. Not satisfied with his supremacy in church and state, the great archbishop pressed forward into philosophical and theological controversy, and took his share in those discussions which heralded the incoming

of scholasticism. He opposed the views and influence of John Scotus Erigena, the head of the palace school of Charles, and may be perhaps said to have given that direction to thought and speculation which marks in the main the course of the whole philosophy of the schools.

Toward the end of his reign there was only one prince, Ludwig the German, who shared with him the vast empire of Charles the Great. And in 875, on the death of Ludwig II., emperor and king of Italy, a handful of bishops and counts assembled at Pavia offered the imperial crown to both these princes. Charles arriving first, was forthwith proclaimed "protector, lord, and king of Italy" by the Pope. In the next year Ludwig the German also died, and Charles, not content with the imperial dignity, which he already possessed, nor with the ample extent of the territories nominally subject to him, desired to restore the old imperial unity, and to obtain the crown of Germany in addition to those of the west and south. The sons of Ludwig naturally resisted; and then, in order to secure the hearty aid of his followers, he held the diet of Quiersy-sur-Oise (*Carisiacum*) in which was drawn up the great capitulary sometimes styled the *Magna Charta* of French feudalism. Beneath a cumbrous covering of words, and connecting the hereditary succession of his own son with his large concessions to his nobles, Charles in fact conceded hereditary rights to all freeholders. Any lord who should desire to renounce the world might leave his benefices and honors to his son, or otherwise as might seem good to him; and any lord whose hold on his worldly goods was brought to an end by death might leave his dignity to his son (Baluze, *Capitularies*, ii. p. 259), and thus in definite terms the hereditary usage of centuries became hereditary right. Hitherto, in France at least, a fiefholder held at his lord's pleasure, and was, in theory, liable to deprivation at any time; henceforth he was as secure in law as in fact, and could transmit his lands and dignities to his son without risk of loss. The title of duke or count is henceforth attached to one family; as the royal and the imperial power became weaker, the great families grow in strength; until a century of *fainéant* Carolings comes at last to an end, and their place is taken by the representative of one of the great houses, the duke of France and count of Paris. Then the new kingdom of France, with its new capital, will begin with Hugh Capet in 975. For the family of the counts of Paris had come to occupy the ground abandoned by the Carolings; they were the champions of Gallic people against the Northmen. Only twenty-seven years after the death of Charles the Great, in 841, Rouen had fallen into Norman hands, opening the way for them up the rich Seine valley as far as to Paris. From that moment the city had no peace; and in 861 Charles the Bald invested a brave adventurer, Robert the Strong, with the county of Paris, and sent him to resist the invaders. Bravely he struggled against them, and in the end gave up his life in defense of his people. In so doing he laid the foundations of the first French monarchy; his two sons were, to all practical intents, local kings of France; his great-grandson was Hugh Capet. Very different was the career of Charles the Bald. His famous order to his assembled lords, "Let each man defend himself in his fortress," with which high sanction for castle building and local independence he dismissed his feudal levies to shift for themselves, showed that the center of power was completely gone. The king abandoned his people to any one who would defend them; their defenders rose to greatness, and the Caroling house sank into supine nothingness. Yet he still struggled, though in vain, against the sons of Ludwig the German; after an



unsuccessful campaign in North Italy, death overtook him as he was recrossing the Mont Cenis pass (877). Louis his son succeeded him, the Louis II. of French historians, the "Stammerer." He had been for ten years king of Aquitaine, and, when he succeeded to his father's throne, found himself little but the slave and puppet of the great nobles. He soon died (879), leaving a kingship weakened and divided. His two sons, Louis III. in the north, and Carloman in the south, were set on their thrones by the nobles, headed by Count Hugh, "first of abbots." These also soon died — Louis in 882, Carloman in 884; and the representatives of the Caroling family were reduced to two princesses of the name of Charles — Charles the Fat, the emperor, son of Ludwig, the German, and Charles "the Simple," "the Fool," a child of five years, youngest son of the stammering king. To the emperor fell the nominal sovereignty over the chief part of the Caroling territories. He, however, was incapable, lazy, a most degenerate shoot of the great house of Pippin. In France he did almost nothing; the Northmen scourged the land incessantly, and in 885–886 laid terrible siege to Paris. The citizens, led by their bishop Gozlin, by Hugh, "first of abbots" (for he was abbot of St. Martin at Tours as well as of St. Denis), and by Odo (Eudes), count of Paris, made heroic and dauntless resistance. In vain did Hrolf the Northman press the town with active siege or dull blockade; the death of Gozlin and Hugh could not shake the fortitude of the defenders; Count Eudes repulsed attack after attack, and held his own. At last Charles the Fat appeared on Montmartre with a great host of Germans; and the Parisians hoped to see vengeance taken on their pagan foes. Charles the Fat, however, had none of their heroism; he contented himself with buying the Northmen off. As they retired, the citizens rushed out and inflicted one great blow on them, and the great siege was over. Charles withdrew into Germany, and in 887 was deposed and abandoned by all. He died the next year at Reichenau.

On his death in 888 the nobles of France, irritated against their half-foreign Caroling lords, chose Eudes, the stout defender of Paris, the elder son of Robert the Strong, as their king; he ruled over the land between the Meuse and the Loire, and was the forerunner of the Capetian line of princes, the first person who may be spoken of as a French king. The Carolings still spoke German, and had small love for France; the family of Robert the Strong was patriotic and vigorous, and had shown in the great siege that it might be trusted for defense. In the election of Eudes we see the victory of the feudal lords over the imperial or royal power; we feel that the Frankish name and influence are dying out, and that another set of lords and defenders is rising up to cope with the Northmen, and to reduce the land into something like order. Eudes ruled from 888 to 893, striving manfully against the Northmen, whom he so far quelled as to induce them to cease from their devastations of France, and to turn their arms against the English shores. He tried in vain to conquer the southern parts of France, and after a long struggle was fain to leave them in their independence. Then the southern lords held a great assembly with the Caroling party of the north at Rheims in 893, and elected Charles the Simple their king. He placed himself under the protection of Arnulf, king of Germany, who formally invested him with the kingdom of France, and sent soldiers to assert his claims. This was quite natural; for in the eyes of the Carolings the head of the German branch was the head of the whole family; all other members of it were his vassals, them he protected, to him they swore allegiance. After a struggle of some years Eudes died,

and Charles then became sole king of France. Robert, brother of Eudes, received the title of duke of France and these two personages headed the two parties, the Germanic Carolings and the French-speaking nobles.

Charles the Simple reigned undisturbed for many years; perhaps he was not altogether so foolish as his name declares him. In his day the Northmen, hitherto mere depredators, became permanent settlers in France. Everything there was so weak and defenseless that the invaders had only to choose; the miserable people, the old Celtic inhabitants of Gaul, welcomed their settling; it was a relief from the infinite woes under which the land was suffering. One band of Northmen established themselves on the Loire; another, under Hrolf, the fierce leader of the attack on Paris, settled at Rouen (911) and subdued all the country round, on both sides of the Seine. An orderly and strong government once more grew up in France, and Charles the Simple, advised by the churchmen, made terms with Hrolf, giving him his daughter Gisela to wife, and on due feudal tenure, granting him the lands he had won by the sword (912). The stout pagan was baptized by the name of Robert; his followers, after their fashion, loyally did as he had done, and the history of Normandy began; Hrolf becomes Duke Robert, his people become Frenchmen. The duchy soon grew into a compact and orderly state, prosperous and vigorous; Norman towns and churches sprang up on all hands, French manners and speech soon ruled supreme, and in all the arts of peace, in building, commerce, letters, the Normans forthwith took the lead. The noble Scandinavian race, destined to influence so large a portion of the world's history, herein made worthy mark on the soil and the institutions of France.

Soon after this time the French lords, headed by Robert, duke of France, the "king of the barons," second son of Robert the Strong, rose against their Caroling king, and shut him up in Laon, the last stronghold of his family; thence he fled into Lorraine. On the death of Robert, the barons made Rodolf of Burgundy their king, and continued the strife; and Charles, falling into the hands of Hubert of Vermandois, was held by him as a hostage till his death in 929. Rodolf then became undisturbed king till he, too, died, in 936. The barons, under the guidance of Hugh, "the White" or "the Great," son of Robert, the greatest man of his age, sent over to England for Louis, son of Charles, who had been carried thither by his mother for safety. This is that "Louis d'Outremer," "Louis from Over-sea," who now became king; after showing unusual vigor in a struggle with Otho the Great of Germany, who claimed the kingship over France, he was recognized by all in 941. His reign could be nothing but the miserable record of a struggle against the great lords, Hugh the Great and Richard of Normandy. In this perpetual and wearisome strife he spent his latter days, and died, still a young man, in 954. He was the only man of energy among all the later Carolings. His son Lothair succeeded; his was a long and inglorious reign, ending in 986. His son Louis followed, ruling for a single year. He died childless in 987; and the only heir to the throne — if the feudal lords chose to recognize an hereditary claim — was his uncle, Charles, duke of Lorraine. The barons did not choose to be so tied; they set the Caroling prince aside, and elected Hugh, duke of France, to be king. He was afterward solemnly crowned at Rheims by Archbishop Adalberon.

Thus did Hugh Capet, founder of a great dynasty, come to the throne. With him begins the true history of the kingdom of France; we have reached the epoch of the feudal monarchy.



*The Feudal Monarchy.*—The representative of the house of Robert the Strong, duke of France, held the most central position, and united in himself most elements of strength among the great lords of northern France. His lands lay between the Burgundians and the Normans, and stretched north and south from Flanders to Aquitaine. The lesser barons looked up to Hugh Capet; he was brother to Eudes Henry, duke of Burgundy, on the one side, and Richard the Fearless, duke of Normandy, on the other side was his brother-in-law. He was feudal lord of all Picardy; Paris, Orleans, Chartres, the counties of Blois, Perche, Tours, Maine also belonged to him. Still the accession of Hugh to the throne was not undisputed. Charles of Lorraine, rightful heir to the Carolingian throne, resisted him for a time, and was upheld by a formidable party among the churchmen and the nobles. Hugh, valiantly assisted by the Normans, got his rival into his hands, after a short but bloody struggle, and imprisoned him at Orleans, where he died. But, though mostly victorious in his struggles, which he had to maintain almost during his whole life in order to put down the nobles, some of whom regarded themselves fully his equals, it looked at the time of his death, in 996, as if he was a weaker man than nine years before. The power of his brother in Burgundy also had greatly decreased, while the Norman and Aquitanian dukes were stronger than he—stronger than they themselves had been nine years before. Already in Hugh's lifetime his oldest son, Robert, had been elected, on the king's own wish, as a joint ruler, and it may be ascribed to the care Hugh Capet took to secure the hereditary kingship to his family that the strict law of hereditary succession has been so potent in France up to the time of the Revolution.

Robert succeeded as sole king in 996. He was an easy, kindly man, hardly fit to rule a kingdom that was rent by internal strife, which nobles and clergy never permitted to subside. His peculiarities secured him the surnames of *Le Débonnaire* and *The Pious*, and it can hardly be denied that, in his way, he wished to be a father to the people, but when he died, in 1031, he could look back but on very little good he had accomplished. Three years before his death Robert, duke of Burgundy, had died, leaving war between his sons; the successful Robert secured the dukedom, and earned by the methods he employed in that transaction the title of the "Devil."

Robert I.'s son Henry, who had been crowned joint king in 1017, hardly had a better lot than the two preceding kings. The condition of the whole country, scourged with incessant private war and lacking all central authority, became so bad, that at last the church intervened, proclaiming in 1036 the "peace of God," which was gradually accepted in most parts of the kingdom. In 1041 was proclaimed the famous "*Treüga Dei*," the truce of God, in which all fighting was forbidden from Thursday evening to Monday morning, on all feast days, in Advent and in Lent. Henry, feeling his end drawing near, in 1059, had his son Philip crowned as joint king with himself. He died in 1060, leaving his throne to a prince weaker than himself. The contrast between these petty kings of France and the grim dukes of Normandy must strike every one; Richard the Fearless, Robert the Devil, William the Conqueror, colossal figures, strong and fierce, take all the sunlight from pious Robert, weak Henry and dissolute Philip, kings of France. If we would estimate the power of the kingdom of France at that period by that shown by her kings, we should indeed come to a very delusive result. The different dukedoms, especially that of Normandy, Aquitaine and Brittany, showed vast power,

and were in fact more or less independent. In 1094 Philip was involved in a contest with Rome, the church having taken up the cause of Fulk of Anjou, whom the king had wronged by carrying off his wife. But it was no more the indomitable Hildebrand who dictated the dissolute king of France to make restitution to the wronged Anjou; Gregory VII. had died, and his successor, Urban II., was equal to the king in weakness, although that time fighting for a creditable cause.

In these dark, cloudy times the papacy, by a wise instinct, took for its motto the ancient "*ex Oriente lux*," which in this case we might translate a little freely by, "The Saracen may bring us help," and placed itself in the van of that general movement which brought on the crusades. A fine opportunity this, to rid itself of turbulent French nobles, grim and rapacious Normans, and ever-protesting German Ghibellines, who all might be induced to go warring against the increasing power of the Mussulmans, leaving in the meanwhile their country to be taken care of by the clergy.

How the crusades were brought about, and what they accomplished, has been treated elsewhere in this work. (See *CRUSADES*.) We limit ourselves therefore solely to mentioning the influence they exercised upon the French Monarchy. As the first crusade was mostly popular in its character, and the nobles had not taken a large part in it, its influence on France at the time of Philip could hardly be felt; the papacy alone was at first seen to be a gainer by the movement; for the new and rigid feudalism of Jerusalem, with its hierarchy of lords, and its code of justice, all eventually looked upon the papacy as its head. In one respect the first crusade is specially interesting to France; her language, newly assured of independent life, no longer a patois or a dialect of the common Latin, received fresh recognition, and spread abroad in the world. Following the traditions of his house, Philip, in 1100, had made his son Louis joint king.

The latter differed widely from his ancestors; he had force of character, and his prowess in battle earned him surnames like "the Wideawake," and the "Bruiser." The most marked characteristic of King Louis VI.'s reign was the growth of town liberties, which began just before and after the year 1100. France has always been remarkable for the large number of her small towns and her deficiency in large ones; the time we have reached gives us the beginning of this phenomenon. The little towns all through central France now became the refuge of the population against feudal lawlessness and oppression; and in the very center, in the district around Paris, they took up the defense of the royal power against its most dangerous feudal neighbors. Louis VI. was the first king of France who interested himself in the welfare of plowmen, laborers and poor people generally, a thing almost unheard of in those barbarous times. Popular communities were established by the bishops, in such sort that parish priests accompanied the king to siege or battle, bearing the parish flag, and followed by all the youth of the township. The king placed himself at their head. As each parish priest, representing some little town, marched with the banner of that saint to whom his church was dedicated, so did King Louis go forth with the flag of his own church, the oriflamme of St. Denis. He is the first king of France who bore it officially. But while granting liberties and privileges to the towns, he was by no means forgetful of his own interests. He gave and withdrew charters only as it suited him and according to the payment he received for them.

By degrees Louis VI. secured his frontiers to the east, the north, and the south; with the fierce Normans in the west, however, he had more trouble. In 1119 he lost the



battle of Brenneville, and had to abandon the cause of William Clito, son of Robert, duke of Normandy, who claimed the duchy against Henry I. of England. In 1124 Henry Beaclerc had allied himself with his son-in-law, Henry V. of Germany with the intention of overrunning France. But it was on this occasion that Louis VI. showed how powerful he had become. His own men at once gathered around the oriflamme; Champagne, Burgundy, Vermandois, Amiens, and Beauvais followed, and the aggressors drew back in dismay.

Louis VI. may be called the first real king of France. Had his successor been a man like himself, the task of welding France into one kingdom might have been achieved centuries before it was at last brought to pass. Louis VI. died in 1137, and was followed by his son Louis VII., whom he had crowned already as joint king in 1131. Very unlike his father, Louis "the Young," as he was called, proved himself in every way a weak, contemptible man, the delight of monkish chroniclers. In his reign falls the second crusade. The king took part in it, losing thereby southern France and becoming an object of contempt to his own people. He returned home in 1149 with the merest fragment of an army. His ill success alienated his wife, the proud Eleanor of Aquitaine, who succeeded in getting a divorce from him. Then Henry of Anjou wooed and won her, becoming thereby the strongest prince in France. In 1154 he ascended the English throne as Henry II. Forthwith began the struggle with the French king, which lasted through the whole of Henry's life. The latter was in every respect Louis' superior; he actually overshadowed all the other princes of Europe. Louis, in 1179, feeling himself old, caused his son Philip, then aged fifteen, to be crowned joint king. At the coronation of Philip Augustus at Rheims, it is said that the twelve peers of France, six laymen, six ecclesiastics, were all present. They were the dukes of Normandy, Burgundy, and Guienne, the counts of Flanders, Champagne and Toulouse, the archbishop of Rheims, and the bishops of Laon, Noyon, Chalons, Beauvais, and Langres.

Louis died in 1180. He had been sole king since 1137.

Philip Augustus (1180-1223) began his long reign with acts of rigor and severity. Besides Normandy, Touraine, Anjou, Maine, and a large part of Poitou, which he seized by force after confiscation had been adjudged by parliament against king John of England, who held them by inheritance, he acquired by various means the counties of Artois, Vermandois, Valois, Auvergne, and other territories. The count of Flanders and his allies, the king of England and Otto IV. of Germany were overcome by Philip in the battle at Bouvines, in 1214; and thenceforth the royal power was paramount.

During Philip's reign the third crusade took place, which brought much barren glory to Richard Cœur de Lion, which caused the death of the German emperor, Frederic Barbarossa, and added nothing to the honor or power of the French king. Philip's government was wise and tranquil; he allied himself closely with the church throughout, and when he died in 1223, he left a large part of the fortune he had amassed, to the clergy, while he took care to hand his great territories unbroken to his son Louis VIII., who reigned but three years (1223-26), dying of camp fever, while on an expedition against Avignon. His son, Louis IX., the Saint, was twelve years old at his father's death, and his vigorous and ambitious mother, Blanche of Castile, ruled him and the land thoroughly and successfully up to his becoming of age. The traditional policy was followed under the reign of Louis IX.; treaties and marriages were concluded, which secured the ultimate possession of Languedoc and Provence,

while the commons, or the third estate, as it was then called, was placed under the more immediate control of the king. The introduction of the Roman law and the regular constitution of the parliament, forming a high court of justice, which was to supersede gradually all feudal jurisdictions, were important additions to the efficiency of the royal power; the limitation and definition of the powers of the church, through Louis' pragmatic sanction in 1269, was another step in this direction; while the king's personal good qualities conciliated the respect and affection of the nation. Louis the Saint took the cross in 1244, with his three brothers, Robert of Artois, Alphonse of Poitiers and Charles of Anjou, but it was not till 1248 that he set sail for Cyprus, the rendezvous for this crusade. Egypt formed this time the point of attack of the crusaders, but Damietta was the only place they conquered, and Louis returned in 1254, a sorrowful and beaten man. But nothing would quell the enthusiasm of the crusading spirit in his heart. In 1267 he again took the cross, and in 1270, in spite of the remonstrances of his wisest friends, he set sail not for Constantinople or Palestine, but for Tunis. Failure followed the expedition from the beginning; hardly were the crusaders landed, when fever and dysentery set in. The king was infected, and died (1270).

The influence secured by Louis the Saint for the royal title was sustained by his successors Philip III. and Philip IV. (the Fair), who, though greatly inferior to their ancestors in ability, completed the monarchical system that was to prevail for several centuries. They leaned more than ever upon the third estate in order to counterbalance the ascendancy of the two privileged orders. Men of low birth had already been introduced into the parliament; under Philip IV. (1285-1314) their influence increased, and representatives of the third estate were admitted to the general assemblies of the nation, which before had consisted only of deputies from the clergy and the nobility. The chief events of Philip's reign were his quarrels with Pope Boniface VIII., by whom he had been excommunicated, but whom he finally overcame and took prisoner; the removal of the papal see to Avignon, and the suppression of the order of Knights Templar. In spite of the heroic defense and resistance of the latter, Philip had them condemned in 1310, and they perished as martyrs to their cause. Philip died in 1314 from the effects of a hunting accident. He left three sons, who all succeeded him. The reign of Louis X., the quarreler, was brief and unimportant. He died in 1316, being followed by his next brother, Philip V. "the Tall." He reigned six miserable years, dying in 1322. With his youngest brother Charles IV., "the Fair," the direct line of the house of Capet came to an end (1328).

Charles, count of Valois, was the younger brother of Philip the Fair, and therefore uncle of the three sovereigns lately dead. Both by right of relation and by choice of the peers his oldest son Philip succeeded to the throne, beginning the Valois dynasty; but Edward III. of England, by virtue of hereditary right derived from his mother's side, claimed not only such provinces on the continent as had been taken from his ancestors, but the whole Kingdom of France. Those claims and still more the folly of Philip VI., who in 1336 persuaded Louis of Flanders to arrest the English merchants then in Flanders, thus provoking retaliatory measures at the hands of Edward, led to the great wars which were destined to last 116 years, and to exhaust the strength of two powerful nations. They brought brilliant but barren triumphs to England, and, like most wars, were a wasteful and terrible mistake, which, if crowned with ultimate success, might, by re-



moving the center of the kingdom into France, have marred the future welfare of England; for the happy constitutional development of the country could never have taken place with a sovereign living at Paris, and French interests becoming ever more powerful. Fortunately therefore, while the war evoked by its brilliant successes the national pride of Englishmen, by its eventual failure it was prevented from inflicting permanent damage on England.

The war began in 1337 and ended in 1453; the epochs in it are the treaty of Bretagny in 1360; the treaty of Troyes in 1422; the final expulsion of the English in 1453. Four kings occupied successively the throne of France during those bloody struggles: John II. (1350-64), Charles V. (1364-80), Charles VI. (1380-1422), and Charles VII. (1422-61).

Twice France was on the eve of becoming a dependency of the English crown. In 1340 an English fleet destroyed the naval force of France at Sluis, on the coast of Flanders; in 1346, at Crécy, the English archers won unexpected victory over the flower of French chivalry; and ten years later, at Poitiers, the Black Prince not only defeated King John, but made him prisoner.

The utter degradation of the nobles and the misery of the country at those times gave to the cities of France an opportunity which one great man, Etienne Marcel, provost of the traders at Paris, was not slow to grasp. He fortified the capital and armed the citizens, and when the dauphin Charles, grandson of the king, convoked the three estates at Paris, it was soon seen that the nobles had become completely demoralized and powerless. Clergy and burghers were united against them. Etienne Marcel, with the help of Lecoq, bishop of Laon, called the states again together, and endeavored to lay down sound principles of government, which Charles the dauphin was bound to accept. But Marcel's triumph lasted but a short time; in 1358 he was murdered by the dauphin's party. The outbreak of the miserable peasantry, the Jaquerie, also darkened the time; they were repressed with terrible bloodshed. Charles V., surnamed the Wise, by his vigorous policy, succeeded in quelling internal disorders, and with the help of his great constable, Du Guesclin, he regained in a few campaigns all the English acquisitions in France, with the exception of a few important seaports.

At the death of the king France seemed in a fair way of recovering from her terrible sufferings, but the minority and subsequent insanity of Charles VI. were again the sources of the deepest misery for the unfortunate country. There is no more gloomy period of French history than the coming fifty years. It is the record of party strife of a mean and unscrupulous kind, where treachery and assassination were brought into full play against each other by the hostile parties. The house of Burgundy and that of the duke of Orleans are the most conspicuous in that struggle. The former was headed by men of grasp and power, and its party bore the name of Burgundians, little as it expressed the true position; while the duke of Orleans was a mean and foolish person, and his party did not go by his name, but, by some accident, took that of the count of Armagnac, who was father-in-law to the duke of Orleans, and a prince of great name and vigor in the south of France.

The duke of Burgundy was Philip the Bold, fourth son of King John of France, to whom his father had granted the duchy on the death of Philip de Rouvres, who had left no heirs, so that his inheritance had escheated to the crown. Philip was married to Margaret of Flanders, to whom the county of Burgundy had descended by female succession, and he thus re-

united the duchy and county, becoming at the same time lord of Flanders. He was popular with the cities of northern France, especially with Paris, and, by supporting the house of Lancaster in its successful attack on Richard II., and winning thereby the friendship of Henry IV. and Henry V. of England, he added much to his strength. In resources, the house of Burgundy was deemed the richest in the world.

The strength of the duke of Orleans, on the other hand, lay in the south, beyond the Loire, and his party represented the old aristocracy against the modern princes and the awakening spirit of liberty in the cities. In his foreign politics he and the court sided with the losing house of York in England, Richard II. having in 1396 married Isabelle of Valois, eldest daughter of Charles VI. At the beginning the Armagnacs were a mere court party of nobles, without any patriotic aims or feelings; as, however, time went on, and the house of Burgundy more and more made common cause with that of Lancaster, and when England and Burgundy, in the days of Henry V. and Bedford, seemed to be subjecting France forever to the foreigner, then the Armagnac party gradually asserted a far higher position for itself, and took up the national cause, and, rousing the hitherto unconscious patriotism of the people, swept away the invader and his friends.

Duke Philip of Burgundy died in 1404, leaving his vast inheritance to John the Fearless, the deadly foe of Louis of Orleans. These two nobles now involved France in a long chain of internal wars, regardless of the threatening attitude of the English, ever ready to renew their inroads on French territory. In 1407 the duke of Orleans was foully murdered by a Burgundian partisan at Paris. For a few years the strife continued, obscure and bad; a league of French princes and nobles was made to stem the success of the Burgundians, who were strongly supported in Paris by the "Cabochians," the butcher's party. In 1412 the princes were obliged to come to terms, and the Burgundian triumph seemed complete. But already the next year we find the Armagnacs in Paris, rudely sweeping away all the Cabochians with their professions of good civic rule. The duke of Berri, uncle of Charles VI., was made captain of Paris, and for a while all went against the Burgundians, until in 1414 Duke John was obliged to conclude the first peace of Arras and to confess himself worsted in the strife.

As soon as Henry V. of England had secured the throne, he offered to marry Catherine, the king of France's third daughter. His offer, with the conditions he attached to it, were refused by the French court, and the young man, eager for war and renown, took this refusal for an excuse to invade France. In 1415, while party strife was still raging in that country, he captured Harfleur, and defeated the French chivalry at Agincourt with frightful carnage. Still, in spite of the fact that the flower of their knighthood lay buried in the graves of Agincourt, the Armagnacs for three years longer made head against their foe, till, in 1418, the duke of Burgundy's friends opened the gates of Paris to his soldiers. Then, indeed, it seemed as if France was going to fall to pieces.

Henry took Rouen; the dukes of Anjou, Brittany and Burgundy made several independent treaties with him. The rapid progress of the English did not stop the strife or faction; on the contrary, matters were even made more hopeless by the murder of John, duke of Burgundy, in 1419, even as he was kneeling and offering reconciliation at the young dauphin's feet. This atrocious act drove Burgundy, that is, the northeast part of France, over to the English. An insane king, a queen of foreign origin, impelled by her unnatural ha-



tered to her son, the dauphin, and a prince, carried away by his thirst for vengeance, concluded the famous treaty of Troyes, 1420, by which the royal inheritance of France was delivered to her covetous enemy. Henry V. of England was offered the hand of Catherine, was appointed heir to Charles VI., and, while that wretched monarch was still alive, was to assume the power of regent.

It was in this hour of greatest degradation and helplessness that there arose for France a savior in Joan of Arc, the simple country maiden, who, incited by feelings of the purest patriotism, suddenly rallied the forces of her beloved country, at once roused the national enthusiasm to the highest degree, and succeeded in defeating the power of the English. The disinherited son of Charles VI. was now triumphantly conducted to Rheims, to receive there the royal unction (1429); but it required twenty-four years more of constant warfare to finally drive the invaders from the country. This was accomplished in 1453, with the exception that the seaport of Calais remained in English hands, to be retaken 105 years later.

With the end of the English wars new life began to gleam out on France, the people grew more tranquil, finding that toil and thrift bore again their wholesome fruits; Charles VII. did not fail in his duty, and took his part in restoring quiet, order and justice in the land. The condition of the nobility became altogether changed; the old feudalism was giving place to a newer order, in which the aristocracy, from the king's brother downward, grouped themselves around the throne, and began the process which reached its unhappy perfection under Louis XIV.

Charles VII.'s last years were somewhat embittered by the conduct of his crafty and ambitious son, Louis XI. It came to an open rupture between them in 1456, and Louis fled to the court of Duke Philip of Burgundy. There he lived at Genappe, meddling a good deal in Burgundian politics, and already opposing himself to his great rival, Charles of Charolais, the last duke of Burgundy. Louis XI. succeeded his father in 1461. His reign may be divided in three periods. The first six years of it represent his strife with his great lords (1461-1467); the next period, of nine years, is occupied by his rivalry with Charles the Bold (1469-1476); the third, a time of seven years, gives us the king "triumphant and miserable."

The most powerful of all Louis XI.'s rivals, against whom the latter had long carried on intrigues by every means in his power, allowed his pride and obstinacy to lead him on to a war with the Swiss confederates, in which he finally lost his life (January, 1477). The king at once seized upon part of the large inheritance left by the formidable vassal, and the duchies of Burgundy and Picardy were thus annexed to the crown. The fine provinces of Anjou, Maine and Provence, besides claims upon the kingdom of Naples, were bequeathed to Louis by the last prince of the house of Anjou; the king of Aragon resigned to him the counties of Roussillon and Cerdagne; and France, reaching thus her natural frontiers toward the south and the southeast, became one of the great powers on the Mediterranean. In the last days of his life Louis XI. shut himself up in gloomy seclusion in his castle of Plessis, near Tours, and there he died in 1483. A great king and a terrible, he has left an indelible mark on the history of France, for he was the founder of France in its later form, as an absolute monarchy, ruled with little regard to its own welfare.

Charles VIII., who now succeeded, was but thirteen years old at his father's death. Happily the dying king had intrusted the guardianship of the young prince to

his elder sister, Anne, wife of Peter II., lord of Beaujeu and duke of Bourbon.

For more than nine years Anne of France was virtual king. Her prudence and high intelligence overcame her brother's ill-will, and defeated the plots of the nobles, and, almost in spite of Charles, won for him a complete triumph over feudalism. France flourished greatly under her; she solaced the people according to her dying father's wish. It was she who outmaneuvered Maximilian of Austria in his wooing of Anne of Brittany, and secured the great prize, the heiress and her lands, for her brother Charles. In 1491 the marriage took place, which led to the eventual absorption (1515) of Brittany into the kingdom of France.

Under Charles VIII., a French force invaded Italy in 1494 and conquered the kingdom of Naples without opposition. But a league of Italian states was formed behind his back, and Charles was unable to cope with them. Almost as promptly as he had come he had to cut his way home again. This was the first of a long series of Italian wars, in which France was almost constantly engaged for more than half a century, with varying success and under several monarchs. Charles' health was ruined by debauchery in Italy, repeated in France, but toward the end of his reign he attempted to rule prudently, to reform the state, and to solace the poor; wherefore, when he died in 1498, the people lamented him greatly as a ruler at once kindly and affable, and brave on the battlefield.

He left no male issue, so that Louis of Orleans, his cousin, was nearest heir to the throne, and succeeded as Louis XII. He was lazy and of small intelligence, yet kind and humane to his people, friendly and without revenge or malice. He met at first with some success in Italy, and tried all the arts of diplomacy to secure his conquests; but he was no match for the Italian politicians of the sixteenth century, and still less for the crafty Ferdinand of Aragon. By the latter he was forever expelled from Naples, of which he had partly taken possession, while Pope Julius II., the republic of Venice and the princes of Italy, availing themselves of Spanish, German and even English alliances (the Holy League), forced him out of the duchy of Milan, which he claimed in right of his grandmother, Valentia Visconti, and had twice conquered. A diversion in favor of Louis XII., made by James IV. of Scotland, failed completely; the Scottish king was defeated and slain at Flodden Field. The death of Anne of Brittany left the king a widower in 1514. Still hoping for a male heir, he married again, wedding Mary Tudor, the lovely young sister of Henry VIII. His death followed on New Year's day, 1515. Claude, the king's eldest daughter, had been previously married to Francis of Angoulême, great-grandson of that Louis of Orleans who had been assassinated in the days of the strife between Burgundians and Armagnacs. To him, as the nearest heir, fell the crown of France. Francis I.'s reputation is infinitely beyond his deserts; his reign was a real misfortune for France, and led the way to the terrible waste and mismanagement which mark her history throughout the century. His first appearance in Italy was accompanied by success; he won the battle of Marignano (1515) by the timely arrival of his Venetian allies, who fell upon the back of the already victorious Swiss. But in Charles V. he was to face an adversary vastly his superior. In 1525 he suffered a disastrous defeat at Pavia, was taken prisoner and carried to Madrid, where, in order to gain his freedom, he agreed (January, 1526) to a treaty, by which he forfeited Burgundy and all claims to Naples, Milan, Tournay and Arras. No sooner, however, was he set at liberty than he secured from the pope his release from the oath binding him to his arrangement, and concluded



with the pontiff of Rome, the duke of Milan, and the republic of Venice, the second holy league. In 1527 Henry VIII. of England was induced to join the alliance. Still the French met with no success. Pope Clement VII. was forced to conclude an accommodation with the emperor, and Francis was compelled to accept the so-called "ladies' peace," concluded at Cambrai (1529) by female relatives of the contending monarchs, which was but little less disastrous than that of Madrid.

No sooner had the treaty of Cambrai been concluded, than Francis began to look out for new pretexts and means for war. And circumstances seemed to favor him this time. The reformation had begun, and the emperor was now obliged to turn his attention to Germany. Francis seized every opportunity of weakening his rival by more or less directly encouraging the Protestant princes there in their hostile attitude toward the imperial power. The French army was also strengthened during this period; an alliance was concluded with England; in 1536 the war again broke out. Though the two ensuing campaigns, the French in Italy, and the imperialists in Provence, equally failed, peace did not follow till 1538, when after the terrible defeat of Ferdinand of Austria by the Turks, Charles was anxious to give exclusive attention to Germany. Then the agreement of Nice was made, which included a ten years' truce and the abandonment by Francis of all his foreign allies and aims. When, however, Charles V. refused to invest the duke of Orleans, second son of Francis, with the duchy of Milan, and when his second expedition against the Turks proved a complete failure, Francis, relying on the support of the sultan and the Protestant German princes, declared war again (1541). This last war was as mischievous as its predecessors; no great battles were fought, while the strength of both combatants alike was wasted in enterprises barren of successful results. The peace of Crespy, which ended the wars between the two great rivals, was signed in 1544, and like the wars which led to it, was indecisive and lame. Francis died in 1547. Henry II., who succeeded in 1547, had all the faults of his father, with a weaker mind, and as strength of mind was by no means a predominant characteristic of Francis I., we may imagine how little firmness there was in the gloomy king who now reigned. The first part of his reign was occupied with a war with England, and in 1552 the struggle against the Hapsburgs was renewed, lasting, with brief intermissions, till 1559, when the peace of Cateau Cambrésis gave to it a decidedly favorable termination for the French. As a sequel to this peace, Henry II. held a great tournament at Paris, at which he was accidentally slain by a Scottish knight in the lists. In the last years of the conflict preceding the peace of Cateau Cambrésis, Henry had allied himself with the Protestant princes of Germany, and had thus, in some degree, though unwillingly, favored the spread of the Protestant ideas in France, where Calvinism had already gained a widespread influence among the people as well as among the nobles. Both Francis I. and Henry II. had attempted to check the progress of the new beliefs, and had resorted to the greatest oppression and persecution to attain this end. Henry's son and successor, Francis II., so increased these during his short reign as to arouse the Huguenots to self defense, which they were now strong enough to attempt; and with this period began the disastrous religious civil wars which raged so fiercely in France, and lasted with more or less violence till 1598.

At the accession of Francis II. to the throne, however, the court parties, who afterward became most conspicuous in the religious wars, were not marked simply by their religious views. On the Guise side, the cardinal of Lorraine was the cleverest man, the true head, while

Francis the duke was the arm; he showed leanings toward the Lutherans. On the other side the head was the dull and obstinate Anne of Montmorency, the constable, an unwavering Catholic, supported by the three Coligny brothers, who all were or became Huguenots. The queen-mother, Catherine de' Medici, fluctuated uneasily between the parties, and though a Catholic by name, did not hesitate to befriend the Huguenots if the political arena seemed to need their gallant swords. Their noblest leader was Coligny the admiral; their recognized head was Antony, king of Navarre, a man rather foolish, but gallant and fearless. The Guises owed their predominance chiefly to the influence they exercised over the young wife of Francis II., Mary of Scotland, while the Huguenots derived their strength mainly from their strong aristocratic connections.

The prelude to the war troubles was played by the Huguenots, who in 1560 formed a plot to carry off the young king; for Francis, as we have already noticed, had treated them with considerable severity. The plot failed, and only contributed to increase the influence and power of the Guises. At an assembly of the states-general at Orleans, they had the prince of Condé and the king of Navarre seized on a charge of having taken part in the abduction scheme against the king. It would have gone hard with them, had not the sickly king at this very time fallen ill and died (1560).

No fewer than eight wars mark the reigns of Francis' successors, Charles IX. and Henry III., a period of twenty-eight years. The Protestants held their ground with tenacity and accomplished wonders under their illustrious leader, Admiral Gaspard de Coligny; but the latter, thoroughly honest and too ready to confide in the honesty of others, permitted himself to be deceived by fair promises of Catherine de' Medici, and with thousands of his companions was treacherously murdered on St. Bartholomew's night, 1572. The chief guilt of this crime lies with Catherine de' Medici; for though it is certain that she did not plan it, long before assassination was a recognized part of her way of dealing with Huguenots. The Guises may well share with her; they planned and executed the hasty act. The king's share in it was, like himself, weak and impulsive; he was the last to come in, the first to repent. The evil deed was highly applauded as a master stroke by the pope and Spanish king. The fearful massacre did not, however, annihilate the Protestants, who continued the struggle against the Holy League or Catholic union, which had been organized for the better protection of the Catholic church in France, and which was upheld by the pope and Philip II. of Spain. Charles IX. outlived the horrors of Bartholomew but two years. He died (1574) in misery, leaving the ill-omened crown to Henry of Anjou, king of Poland, his next brother, his mother's favorite, and the worst of a bad breed. It is said that the cardinal of Lorraine had sketched the Holy League years before Henry III.'s ascension to the throne. It formed now the most powerful body arrayed against the Protestants. The head of the league, duke Henry of Guise, secretly aimed at the crown, and his popularity seemed to predict his success, when Henry III. during the session of the states-general at Blois, had the duke and cardinal of Guise murdered by his body guards, known as the "forty-five." This atrocious deed brought the king no solace or power, and a few months later he was himself slain by the dagger of Jaques Clément, a fanatical, half-witted priest. His mother did not live to see the end of her son, she died shortly before him, and must have been aware that her cunning and her immoral life had brought nothing but misery to herself and all her race. Dying, Henry III. had recommended Henry of Navarre to his courtiers



as his heir, but the league party had pledged itself to resist the heretic, and Henry IV. at first had little more than the Huguenots at his back. His personal qualities and bravery finally conciliated many of the Catholic royalists, but he could hope to be recognized as king by the majority of the nation only on his conversion to Catholicism. To this he assented, July 25, 1593. The Huguenots, little as they liked this act, could not oppose it, and hoped to profit by their champion's improved position. Their ablest man, Sully, had even advised Henry to take the decisive step. In 1594 Paris opened her gates to Henry, who had been solemnly crowned, just before, at Chartres, and thus the house of Bourbon was established on the throne of France. Henry's whole attention henceforth was given to the pacification of his kingdom. He concluded with Spain the treaty of Vervius, May 2, 1598, upon the conditions of the old treaty of Cateau Cambésis, and, by publishing the famous edict of Nantes, he secured the Protestants full religious liberty, admission to all offices and several places of security for nearly a century.

*The Bourbon Monarchy.*—The mediæval history of France closes with the year 1598; henceforth she takes part in modern history. We are coming to the days of great ministers—first Sully, then Richelieu, lastly Colbert, under whose rule France becomes great, almost in spite of her kings.

In 1598, when Henry IV. was at last fully recognized as the king of France on all sides, we find at his court representatives of two policies, which for ages contended for the possession of the great resources of the country. These were the Hispano-Catholic policy, which aimed at uniting French and Spanish interests against the north and west of Europe and on the other side, the policy of the tolerant party, which desired to make France the leader of the Protestant and liberal part of Europe, which allied itself with the Dutch, with North German Lutherans, with the English, and with the Swedes. It is the glory of Sully, of Richelieu, and of Colbert that they advanced the greatness of France by following the latter of these lines, whereas Louis XIV. lost power from the moment that he abandoned himself to the Spanish policy.

As mentioned above, the end of Henry IV's reign was given to the improvement of the condition of the French people, and to the healing of the wounds which had been inflicted on the country during nearly forty years of bloodshed and devastation. Assisted by Sully, his friend and minister, he restored order in all branches of public service, and effected great improvement in the condition of the people. Whether the *Christian Republic*, that great political romance, was ever laid before the eyes of Henry IV., we shall never know; at all events it represents, in a rather extreme form, the broader politics of modern history, and makes a great change in the relations of states. It represented in the main the resistance of France to the Austro-Spanish power, affirmed the general principle of toleration, endeavored to substitute a court of arbitration in place of war, and sought to weld all civilized Europe in one harmonious community. Just while making great preparations for humiliation of the house of Austria, and on the eve of departure for the army, Henry IV. was assassinated by Ravillac, May 14, 1610. All the grand plans for interference in the affairs of Europe, and for the reduction of the house of Austria, fell to the ground at once, and German affairs were left to seethe as they would, until in 1618–1619 they came to a head in the outbreak of the Thirty Years' War.

Under the regency of Henry's widow, Maria de' Medici, mother of Louis XIII., disorders were renewed, the public treasure was recklessly wasted, and the king-

dom fell a prey to war between the queen mother and the young king, soon after the latter had reached majority. Armand du Plessis, bishop of Luçon, and later Cardinal Richelieu, now appears for the first time in the arena of French politics. During the whole reign of Louis XIII., this strong-minded and crafty soldier-prelate directed the fate of France, holding down and crushing with one hand the Huguenots at home, while with the other he boldly attacked the house of Austria, whose humiliation formed the guiding star of all his foreign policy. When Richelieu entered the king's council, in 1624, he was thirty-nine. He was the youngest son of a noble family of Paiton, springing originally from the village of Richelieu. In that family the elder son, if he chose, took orders, because they would always dispose of the bishopric of Luçon, a kind of family benefice; the younger son became a soldier. When his brother gave up his preferment at Luçon, Armand at once left the calling of a soldier, was ordained, and succeeded to the bishopric in 1607. The States-General of 1614 made the young prelate's fortune; he pleased the queen mother, acted with consummate skill and prudence through the ten years which followed, was made cardinal in 1622, and member of the council in 1624. His later life may be divided into four periods: (1) From 1624 to 1626, the time of his first resistance against the Austro-Spanish power, and his failure, as shown by the peace of Monzon; (2) from 1626 to 1628, when he punished the Huguenots of La Rochelle for that failure, and laid firmer foundations for his after success; (3) from 1628 to 1635, the period of his own and his master's despotism in France, and beginning of the interference in the affairs of Europe; and, lastly (4), from 1635 to 1643, the days of his successful lead in the arena of general politics, and of his triumphant overthrow of his domestic foes; the fruits of this period he left for Mazarin to gather in abroad by his triumphs at the peace of Westphalia. Louis XIV. carried out his principles to their utmost development in domestic policy.

The first years of Louis XIV., who ascended the throne as a child in 1643, were marked by his brilliant victories, most of them won by the young Duke d'Enghien, afterward the "Great Condé." The Peace of Westphalia, terminating the Thirty Years' War, in 1648, not only asserted the triumph of religious and political liberty in Germany, but the victory of France over Austria, a victory which added to her territory the province of Alsace. Although the wars of the Fronde revived in some respect the old faction strife, the influence of France abroad was not abated, and Mazarin concluded with Spain, in 1659, the treaty of the Pyrenees, which secured two other provinces to France, Artois and Roussillon. This able politician resigned to the hands of Louis XIV. a kingdom well prepared for the full exercise of absolute power. Under this monarch, who made the famous "l'état c'est moi" his guiding principle, France rose to the height of fortune and glory, while he himself was placed above all control. From the day of Mazarin's death (1661), he began his autocratic government, and his ministers, with the exception of Colbert and Louvois, perhaps, were little more than clerks working under his supervision and direction. The first years of his administration proved most useful for France. Under the administration of Colbert all the resources of the kingdom developed rapidly, every branch of revenue became prosperous, while intellectual progress kept pace with material, and everything conspired to create a literary period of unusual magnificence. A short war against Spain, which was terminated by the treaty of Aix-la-Chapelle, in 1668, scarcely interrupted this happy commencement. But Louis loved war for its own sake, and he never was amiss in finding pretexts for the declara-



tion of war, when the glory of his name and the increase of French territory seemed to demand it. Scarcely one year had elapsed, when he, at the head of more than 100,000 men, invaded Holland, which being deserted by England, could be preserved only by the united exertions of Spain and Germany. The contest lasted six years; the French armies, under Condé, Turenne and Luxemburg, won victory after victory, while French fleets successfully coped with the naval forces of Spain and Holland.

The peace of Nymwegen, 1678, put an end to regular warfare, but Louis XIV., inflated by success, kept on seizing provinces and cities, which, according to his own construction of past treaties, belonged to France. After this peace France could not enough praise and flatter her great monarch; all thought of resistance died away; the needy nobles flocked to his court and begged for place; the king absorbed them all into all possible offices; it is to Louis XIV. that the absolute and fatal severance between noble officer and peasant officer is due. From this time to about 1685 the French monarchy stands at its highest; Europe is amazed and paralyzed; France, if exhausted, is full of glory; and the king is, as has been said, if not the greatest king, the finest actor of royalty the world has ever seen. One person, at any rate, was dissatisfied with the peace of Nymwegen; and that was William of Orange. He devised the league of Augsburg, by which the emperor, Holland, Sweden, and Savoy were united together, and, on the revolution of 1688, also England acceded to it. Louis XIV., who undertook to reëstablish James II. on his throne, engaged in a desperate struggle against this powerful coalition, and maintained it for nine years; his armies and naval forces still achieved many triumphs, but it was evident that fortune no longer favored him as heretofore, and when the peace of Ryswick was concluded in 1697, the allies were able to boast of some success, though almost as much exhausted as the great king himself. France lost by this peace all the places taken from Germany since Nymwegen, excepting Strasburg, and all the strongholds on the right bank of the Rhine; Lorraine also was restored to its German duke. Louis XIV. now turned all his attention to the Spanish question. Charles II., king of Spain, was expected to die without leaving any male issue, and three houses were ready to claim the Spanish heritage. They were the house of Bourbon, the house of Austria, and the house of Wittelsbach. The emperor Leopold, head of the house of Austria, desired the Spanish throne for his younger son, the archduke Charles, nephew (by marriage) of Charles II., and grandson of Maria of Spain, spouse of the emperor Ferdinand III.; Louis XIV. claimed, in spite of renunciations, for Philip, his grandson, grandson of Maria Theresa, half-sister of Charles II., Philip's elder brother, Louis duke of Burgundy, waiving his claim on his behalf. Lastly, Maximilian Emmanuel, elector of Bavaria, claimed for his son Joseph Ferdinand, on behalf of the child's mother, Maria Antonia, daughter of Philip IV. of Spain. A formidable coalition opposed the French king, the two greatest generals of their time, Marlborough and Prince Eugene, were at the head of the allied armies; defeat after defeat befell the French forces and the kingdom seemed reduced to extremities; but after a struggle of twelve years' duration Louis succeeded in his bold undertaking, and his exultant remark, *Il n'y a plus de Pyrénées*, seemed to be verified. The treaties of Utrecht and Rastadt (1713 and 1714), gave to the house of Bourbon the best part of the Castilian monarchy. Yet the now aged monarch was far from having attained his splendid ambitions. The success in the Spanish question, if success it may be called, did

not in any way make up for the terrible losses France had sustained during the long and disastrous war; she had already paid a ruinous price for the glories of a grand monarch and a great age. A reaction was unavoidable; the tyrannical and unwise acts of Louis XIV. had already introduced many of those abuses and elements of discord which were to have such disastrous results.

A short time before the conclusion of the peace, when things were almost at their darkest for France, domestic losses in appalling succession had stricken down the king. In April, 1711, the dauphin died; early in 1712, the duke and duchess of Burgundy and their eldest boy were carried off by fever; in 1714 the duke of Berri also died. And now of the direct line of the Bourbons remained only Louis XIV., and his great-grandson, the duke of Anjou, the future Louis XV. The country was famine stricken; finance in hopeless confusion, the debt grown to vast size; an annual deficit had long been going on. On September 1, 1715, Louis died, leaving the crown of France to his great-grandson Louis, a child of five years. It was with an instinctive movement of relief and pleasure that France received tidings of his death, for the load of misery he had laid on the shoulders of his people had become too great to bear.

For France the eighteenth century begins with the death of Louis XIV. It was an age of depression, decay and ruin for all the institutions, doctrines and classes that had hitherto commanded respect. Royalty lost its prestige, both through the unbounded licentiousness of the regent duke of Orleans and the king himself, and through the irretrievable corruption or imbecility of its ministers; nobility became more and more degraded; the great constituted bodies fell into general contempt, and the national treasury was totally exhausted. The *Mississippi Scheme*, by which the Scotch adventurer Law tried to bring the finances in better shape, only added to the confusion, and the contemptible misrule of the weak king's mistresses, aided by unscrupulous princes, by the Cardinal Fleury, and the infamous Cardinal Dubois, brought France down so low that at the end of Louis XV.'s reign, she could scarcely be ranked among the great European powers. She took part in four wars during the reign of Louis XV.; viz., against Spain (1717-19); for the succession of Poland (1733-35); for the succession of Austria (1740-48), and finally the seven years' war (1756-63), in all of which she earned but disgrace and disaster.

But while France thus sank into weakness and discredit, her great writers were awaking all the dormant echoes of the world, and summoning together the forces which brought on the revolution. Men began to listen to the new ideas which spread swiftly through the country, the more the nobles descended in worth and strength, the more its younger members talked the language of modern humanity which so largely affected the course of events during the remainder of the century.

Louis XV. died in 1774, and his grandson, Louis XVI., who was married in 1770 to Marie Antoinette, daughter of Maria Theresa of Austria, ascended the throne at a period which was perhaps the most inglorious of French history. In the midst of the scandals of the court Louis XVI. had preserved his purity, and with it a charming simplicity which, while it seemed likely to render the difficulties of his position less, seemed also likely to arouse men's sympathies for him, and find him friends in need. He loved his people, as a good despot might, and tried to mitigate their misery in famine times; his kindness, however, was but weakness—his simplicity, stupidity; he was obstinate, and yet



not firm; and his good and bad qualities alike made him incapable of grappling with the new phenomena of society which broke on his astonished sight. The tyranny and lawlessness of the nobles and privileged classes, the burden of heavy taxation and oppression, which rested entirely on the lowest orders, the reckless mismanagement exhibited in every branch of the public service, and the unrestrained personal vice and extravagance of those in authority had driven the great mass of the people into a bitterness of feeling almost beyond description. The various abuses that had grown up and increased during nearly the whole century were now at their height, and it seemed evident that a disastrous crisis was approaching. Louis XVI., no doubt, had some idea of the state of his kingdom when he ascended the throne; but, whatever his good intentions toward reform may have been, he never was the man to carry them out. Maurepas, as a man wholly unfit for the work in hand, was placed at the head of the ministry. An attempt to conciliate the people by the restoration of the parliament of Paris had not the desired effect, but this body proved a real hindrance to it. Whatever good Turgot and Malesherbes, associated with Maurepas in the ministry, brought about, was speedily reversed by the court party, as soon as it saw its privileges and immunities threatened. Necker, who became minister of finance in 1777, was a good banker, but no statesman, and did but little to improve the state of affairs, and that little was swallowed up by the war which France carried on at that time against England in aid of the American colonies. He also was unable to carry through a scheme of taxing the nobles and the clergy, and this, with other causes, led to his deposition soon after the publication of his famous *Compte rendu au roi*. Efforts after efforts were made by succeeding ministers of finance to bring some money into the empty treasury, but all failed on account of the obstinate refusal of the notables to accept any form whatever of general taxation. Throughout the kingdom finally there rose up a cry for the convocation of the states-general. No one clearly knew what these were or how they would work; the last meeting of those august bodies, 173 years back (1614) had broken up in confusion; of the organization, procedure and powers of the estates no one could speak with certainty. Nevertheless, at the moment they seemed to offer hopes of solution of pressing difficulties; and at last the king with much reluctance, promised that they should be called together within five years. In the meanwhile the disorders of finance went on; there was no money with which to carry on the government, and Brienne, minister of finance, at last driven to despair, induced the king, in spite of the queen's strong opposition, to convoke the states-general for May 5, 1789.

The winter of 1788-89 was terrible, especially in Paris; and all France was excited by distress and hope. The capital swarmed with incomers from the country districts round; ever since the great hailstorm of July, 1788, when the crops, ripe for the harvest, had been destroyed in all the best corn-growing districts of France, the district round Paris, crowds of desperate country folk had been pressing in. The government thought little of this for a time; the states-general were to meet, not in Paris, but at Versailles; the capital, long neglected and disliked by the kings of France, was left out of their calculation at this moment.

*The Revolution.*—If ever circumstances, both external and internal, were existing favorable to the inauguration of a revolution, they were those obtaining in France at the beginning of the year 1789. There was, first, the character of Louis XVI. succeeding after his grandfather, then the anti-national temper of his court;

the outbreak of the American War of Independence, the ferment of modern ideas in all the countries of Europe. Next there came a faith of internal conviction, which strengthened the men of younger France to face death for their cause, because their minds were lifted above common life and its trivial affairs. This faith cannot be underrated as a motive power. Sometimes partial and narrow, yet always general and warm, was the enthusiasm of revolutionary France for the "principles of '89," the equality of all men before the law, and for the burdens of citizenship, the excellence of virtue, the sovereignty of the people, obedience to the law, the blessings of freedom of person, press and belief—these and the like, afterward embodied in the *Déclaration des droits de l'homme*, were great engines which set the revolution moving and directed its general course. Joined with these ideas, which could not reach down to all, there was the general feeling of misery, oppression, wrong. Moreover, the divergence of classes, which in France had long been increasing, was such as to endanger in itself the stability of society. Selfishness above, hypocrisy in faith, misery below—these things wanted local leaders to attack, and the leaders were not wanting—they were first the great writers, and afterward the chiefs whom the violence of the time threw to the surface.

Early in 1789 all France was busy with the elections of the states-general, and in drawing up the *cahiers* or papers of grievances. The elections to the first estate, the clergy, returned two hundred and ninety-one members, forty-eight archbishops and bishops, thirty-five abbés and canons, two hundred and eight parish priests. The second estate, the noblesse, returned in all two hundred and seventy persons, one prince of the blood, twenty-eight magistrates, two hundred and forty-one gentlemen or holders of noble fiefs. The third estate was composed of five hundred and fifty-seven members, nearly half of them barristers, and almost all of them united in defense of the country against privilege.

When the three estates met at Versailles (May 5, 1789) it was seen that the points at issue were not easily to be settled. The privileged class, the nobles and the clergy, insisted that the meetings of the body and all its deliberations should be conducted with strict regard to the old class distinctions, the three estates meeting and voting separately, as in former times, an arrangement by which the two higher estates would have been enabled to neutralize the action of the commons. This classification met with the most determined opposition. The third estate were convinced by the treatment they received at the hands of the king and the privileged estates, that all that their masters cared for was that they should arrange for the payment of the deficit and be gone. But they had come together for other purposes. In June, on the proposition of a member, the Abbé Sieyès, the third estate declared themselves the sole body having a right to act as the legislature of France, and summoned the nobles and clergy, as bodies representing only certain classes, to attend their deliberations. At the first call, no response was made by either noble or clergyman; at the second, three curés answered, and were received with enthusiasm; after a short time as many as one hundred members of the clergy joined them. The commons now (June 17, 1789) named themselves the *National Assembly*, and issued a declaration that the creditors of the state were guaranteed by the honor and loyalty of the French nation; that if they were dissolved, taxation levied thereafter would be illegal; that a committee should be named to inquire into the general distress. Then the clergy, by a small majority, agreed to join the third estate; Necker, who had been recalled after the resignation of Brienne, thereon advised the king to



yield the point of separate chambers, and to "deign to resign himself to the English constitution." But the king would not yield. On the contrary, he made an ill-advised attempt to check the course of events, and on the 20th, when the deputies of the commons came to the place of meeting, they found their entrance prevented by a guard of soldiers. In the greatest indignation they gathered in a tennis court near by, and here took a solemn oath not to dissolve their assembly until a constitution for the kingdom should be decided upon and established on firm basis. Under this oath the assembly claimed a new name, that of the Constituent Assembly — the assembly charged to create a new constitution. Once more treated by the court with contempt, because it could not venture to use violence, the assembly next met in the church of St. Louis, at Versailles, on June 22d. On the 23d they were summoned to a "royal sitting" of all the orders, in which the king addressed them as an angry master would his servants, telling them that the orders should not act together, but should meet next day in their separate chambers. When the king rose to go he was followed by most of the nobles, the bishops and some of the clergy; the third estate and a large proportion of the parish priests remained, and Mirabeau was unanimously sustained in sending to Louis his famous message, to the effect that they would only retire if forced to do so by the bayonet. Necker, feeling that the king was completely committed, now resigned.

The duke of Orleans, with forty-six of the nobles, joined the assembly; after that, force being out of the question, Louis XVI. was obliged to tell the remainder of the noble order to join the others. And thus by June 27, 1789, the orders had all accepted the victory of the commons. The king now threw himself entirely into the hands of the court; Necker's resignation was accepted; attempts were made to get regiments that could be trusted to Versailles; the Swiss and German troops seemed the mainstay of the monarchy. On July 12th, when the people heard of Necker's departure from France, the popular uprising began. A national guard under Lafayette was formed, and weapons and ammunition were taken from the public arsenals. On the 14th followed the fall of the Bastille, (*q. v.*) Louis now was ready to conciliate the populace, but it was too late. The events of Paris and Versailles found response throughout France. National guards were organized everywhere; the nobles, attacked by the peasantry, made for the frontiers, some laid down their privileges, and hoped to stay in France. The Assembly, backed by Paris, had all power in its hands, the king had to recall Necker, who, however, was not the man to stem the tide of the Revolution.

The Assembly daily took more decided measures. On August 4th it abolished all feudal rights and privileges of rank and made the well known Declaration of the Rights of Man. The Assembly also framed its new constitution, according to the promise of its oath on the tennis court. A limited monarchy, without an absolute veto, and a single chamber having alone the right of enactment of laws, formed the chief elements of it — the nation to order, the king to execute.

The excitement of Paris grew; famine reigned, distrust and irritation followed. The proceedings at a ball given for a royal regiment at Versailles goaded the hungry populace of Paris to madness.

On October 5th a vast multitude, comprising a large number of women, with some thousands of *gardes Française* and national guards, headed unwillingly enough by Lafayette, streamed out of the gates, and marched to Versailles, insulted the Assembly, then sitting, and swarmed around the palace gates. A struggle

ensued, in which some blood was shed, and the king actually became the prisoner of the mob. Things grew very threatening, and Louis XVI. finally consented to go to Paris.

The assembly now extended the right of suffrage to nearly all the people, who were to choose electors, who should in turn elect national deputies, decreed the confiscation of church property for the benefit of the state and the creation of *assignats* (*q. v.*), and passed an act reorganizing the country into departments and smaller divisions. Louis confirmed all the measures, and in February, 1790, he appeared in the assembly, where he thought to display a conciliatory and liberal spirit. For a while he seemed really to wish to be a constitutional monarch, and till after the fête of July 14th, at which he, the assembly, the national guard and a crowd of spectators from all France renewed, in the midst of boundless enthusiasm, the civic oath, all seemed to promise well. Had Louis been a man of real vigor of character he might have held the movement entirely in his own hands, and have forestalled the future complications of his country, saving it from extreme measures, great excesses, savage civil war, and tremendous efforts to keep off the foreigner. This, however, was not in him; his amiable disposition drew him one way, the traditional belief in his irresponsible and divine right drew him the other; he became undecided; people grew suspicious. Necker, not a strong man, had hitherto been his guide, he had now lost all his popularity, for public opinion had gone far beyond him, and he was not statesman enough either to direct or assist it. He sent in his resignation (September 4, 1790), and was followed by the rest of the ministers, who were suspected of underhand communications with the *émigrés* at Coblenz. Mirabeau (*q. v.*) seemed the only man capable of controlling affairs at this crisis. The suspicion and watchfulness of the Jacobin Club (*q. v.*) and of the extremer party did not hinder that terrible orator of the assembly from openly doing his utmost to preserve portions of the royal authority; and when, early in 1791, he felt that he had some hold on the court, he advised the king to escape to Lyons, and there to establish himself as a mediator between the emigrants and the assembly. But all hope Mirabeau's scheme had awakened was brought to an end by his fatal illness, which brought his life to an end at the most critical moment (April 2d); in the months which followed the aspect of events grew daily graver. On the night of June 20th the king made an ill-arranged and disastrous attempt at flight from France, intending to join the forces of the *émigrés*, with whom Austria, Spain, Hanover, Sardinia and Switzerland had united in a league to resist the revolution. Louis was stopped before he could pass over the frontier, and was carried back to Paris. The assembly at once and with calmness assumed full direction of affairs. Pétion and Robespierre now began their career as republican leaders. On July 17th a multitude, influenced by the leaders of the clubs, gathered in the Champ de Mars to demand the deposition of the king, but Lafayette dispersed the republican crowd with vigorous bloodshed. The constitution of September 3d prescribed that the legislative power should rest in an assembly chosen biennially, as had been before voted, and still, as before, the nominal executive authority remained with the king, as did the suspensive veto. The constitution then was laid before the king; he accepted it at once, and on September 14th he swore in the assembly that he would faithfully observe it.

Then, after decreeing a general amnesty for political crimes and offenses, the assembly (September 30, 1791) declared itself dissolved. The elections to the new as-



sembly, which took place before the constituent dispersed, were loyally made; the king accepted the situation fairly. There were no representatives of the old régime in it to irritate men; violent republicans were few; it was thought that all promised well, and that the legislature would have a long and peaceful life. It met on October 1, 1791, and at once shaped itself into parties, all more or less loyal to the new constitution. The "Extreme Right and the Right" were usually called the Feuillants, and consisted of constituencies, who represented the burgher interests and wished to uphold the king as far as they could. The Girondists, the "Left," were composed of men inclined toward a republic, of the burgher class chiefly, also all devoted to the constitution as it stood; the "Extreme Left," which sat on the higher benches, and took the nickname of the "Mountain," consisted of popular delegates and representatives of the advanced clubs, with Robespierre as their out-of-doors leader at the Jacobin and Danton at the Cordeliers club. The most important early measures of the session were those which declared the *émigrés* guilty of high treason and condemned the priests who refused to take the oath as agitators. Louis vetoed both the measures. The coalition formed against France—Prussia too had lately joined it—offered too much temptation to the unstable king. The supporters of the revolution concluded therefrom that in the two all-important matters—the threat of foreign war from the *émigrés*, and the threat of domestic war from the refractory clergy—Louis was against them and with their enemies. The word "traitor" began to be heard.

After some hesitation the German princes began to show signs of movement; troops were raised by Austria, Prussia, Piedmont; the other monarchs of Europe threatened. In December an army of 160,000 men was raised by order of the assembly. Early in 1792 the property of the *émigrés* was confiscated.

The Girondists had gained the complete leadership of the assembly, and in March the king was forced to dismiss his ministers, and to form a new cabinet from members of this dominant party. Dumouriez held the portfolio of foreign affairs. Urged on by him and the assembly, the king, on April 20th, reluctantly declared war against Austria, and the long conflict between France and the monarchical powers of Europe was begun.

The French army was in a state of great confusion; most of its officers had joined the *émigrés*, who were eager to show the invaders "the way to Paris;" those who remained were suspected by the people; there was little money in the treasury and little experience in the camp. The French consequently had bad success, and at the news of the first defeats of the army, the greatest popular excitement broke out in Paris. The assembly resolved upon the banishment of the priests, and the formation of a force of 20,000 national or federal guards near Paris. Both these measures were vetoed by the king, who on June 13th dismissed his ministers. On the 20th a great body of populace armed with pikes appeared before the meeting place of the assembly, demanded the abolition of the royal veto, forced their way into the hall, read an address in which the king was threatened with death, and afterward marched with violent demonstrations to the Tuileries, which they found prepared for defense, and protected by national guards and cannon. But no resistance was made to the invaders; they pressed into the palace, and for an hour the king and the royal family were in the greatest danger. Still the admirable dignity with which Louis XVI. received the mob, succeeded in dispersing the crowd, more loud and boisterous at this occasion than bloodthirsty. Had the populace, however, known that the king drew his dignity and calmness from the

fact that he had gone entirely over to the party of the emigrants and their friends, by whom he hoped speedily to be delivered from his precarious position, it scarcely would thus have abandoned its undertaking.

Prussia had now also declared war against France, and was on the march. The assembly took measures for self-defense against the court and the foreigners; men began to call for the deposition of the king, the country was in danger, and 50,000 volunteers were decreed; men flocked to enroll themselves from every quarter; the excitement grew daily; the fiercest threats and suggestions made themselves heard. By August 1st all seemed prepared for a violent crisis. The extravagant proclamation with which the duke of Brunswick, who stood at the head of an army of 80,000 men ready to invade France, heralded the opening of his campaign, but added to the fury of the people; and on August 10th the great insurrection, led by the popular chief Danton, swept over the assembly and the monarchy, overpowering everything as it passed along. The attack on the Tuileries, the massacre of the faithful and heroic Swiss guards, the crushing of the assembly and the imprisonment of the royal family followed in quick succession. The Paris people, under inspiration of Robespierre and Danton, were omnipotent. Forthwith began the terrible scenes at the prisons, the mockery of trial, the massacres of "the killers at six francs a day." It was clear that the new commune of Paris was now the sovereign power in France; it established a committee of surveillance, and swept away all the older administrations of Paris. (See COMMUNE.) Danton, Robespierre, Marat, were the leading spirits who inaugurated the Reign of Terror.

Meanwhile the allies took Longwy and Verdun, besieged Thionville, and the road to Paris seemed open to them. The effect on Paris was terrible; no one knew who was in connection with the foreigners; fear and anger made men brutal; the massacres in the prisons went on incessantly. Finally, the spirit which General Kellerman infused into his raw troops staggered the assailants. The cannonade of Valmy, for it was little more, did for France as much as many a great victory could have done; the Germans had to fall back discomfited; the siege of Thionville was raised. By October 1st not one German remained in France. Shortly afterward came news to Paris that the army of Alsace under Custine had taken Worms, Spire and Mainz, where lay the chief magazines of the allies. Savoy was occupied by French troops, who seized on the coast line, and occupied Nice and Villafranca, with its great munitions of war. Abroad the Revolution showed itself proudly and defiantly; at home the National Convention replaced the Legislative Assembly.

*The Republic.*—September 22, 1792, was the first day of the year I. of the Republic. The new government of France reflected the changes which had taken place. Paris sent the chief Jacobins to it; the Girondists sat on the right, and had a large majority; the Jacobins on the left, high up, with the nickname of the Mountain; below sat the "Plain" and the "Marsh," the timid moderates, who leaned toward the Girondists. At once the convention decreed (September 21, 1792), the abolition of royalty in France, and proclaimed the Republic.

On December 11th Louis was brought to trial on various charges, and after a long and exciting trial he was sentenced to death on January 20, 1793, and on the 21st was guillotined in the Place de la Révolution (now Place de la Concorde).

By this act, as the Montagnards themselves said, "the Revolution threw down the glove to all ancient Europe." They had accused their rivals, the Girondists,



of intriguing to save the monarchy, of coquetting with the emigrants and the foreign sovereigns. The Girondists in their turn accused them of being "anarchists sold to the foreigner," men who were treacherously pushing on the Revolution to excess in order to discredit it and to bring in the foreign help which the court desired. The truth is that the Girondists represented the burgher classes, and were honestly eager to establish the new constitution in all its parts; they were on the defense, while the Mountain, the party of offense, represented the suffering populace—eager, defiant, weary of negotiations, suspicious of treason at every point, and zealously determined to push the principles of the Revolution to their limits. Their victory in the trial and execution of "Louis Capet" was complete; it brought with it the ascendancy of Robespierre, who was the prophet who should realize on earth the beautiful and popular dreams of the *Contrat Social*.

The Girondists had to succumb to their fierce opponents. Their fall was finally brought about after a most violent debate, during which bands of the armed mob gathered before the hall of the convention and demanded their punishment. On June 2d the arrest of the Girondist leaders was decided. At first they were only sentenced to nominal imprisonment in their houses, but it was not long before those who did not hide themselves were seized and imprisoned in the *Conciergerie*. In Paris the terrorists were now in full power, and proceeded daily to strengthen their rule by renewed steps against their remaining enemies. On July 13th Marat, who by the majority of the people, especially in the provinces, was looked on as the head and life of the terrorists, was killed by Charlotte Corday, and this murder, instead of aiding the Girondists, only furnished their enemies with another accusation against them. On August 10, 1793, still another constitution was adopted, but was not to go into effect until the end of the war. By the most strenuous efforts and the proclamation of a *levée en masse*, the convention was enabled to bring hundreds of thousands of men in the field to oppose the coalition. In the provinces the conflict with the opposition was carried on with the most relentless cruelty.

In the Vendée the royalist inhabitants were indiscriminately slaughtered. Bordeaux, Marseilles and Lyons were reeking with the blood of the Jacobins' victims. Carrier, in Nantes, invented the system of the *noyades*, by which people were drowned by the wholesale. The same cruelty was perpetrated at Toulon, which, in order to escape the horrors, had surrendered to the English, but was recaptured. Paris itself had been fairly given over to anarchy, and the mob plundered to its heart's content, the commune not interfering with their enriching themselves with the property of the rich. By the decree of September 17th, the convention instituted a course of violence and murder hardly less atrocious than that pursued by Marius and Sulla in Rome. All persons defined as "suspected" by the convention, were executed after the most frivolous trials, or with no trials at all. The queen, Marie Antoinette, and the imprisoned Girondists were among the first victims. After a brief form of trial, Marie Antoinette was led to the scaffold on October 16th. The Girondists, after a brilliant defense, were executed on the 31st. But the convention went still farther. Not till everything existing at the time was abolished and till they had exterminated one another, "the men of terror," could come to rest. By a decree of October 5th, the Gregorian calendar was done away with and a new revolutionary calendar introduced, dated as mentioned above, from September 22, 1792. The Christian religion shared the same fate, the worship of *Reason*

taking its place. Most conspicuous in bringing about these radical changes were Hébert, Anacharsis Clootz and their followers, known under the name of the Hébertists or *enragés*. But Robespierre, who was rapidly making his way toward nearly absolute power, already was desirous of getting rid of the Hébertists. He saw that their acts would weaken his influence with the populace; he had them arrested; they were accused on various grounds, and twenty of them were executed March 24, 1794. Not satisfied with this success, Robespierre, on March 31st, forced the convention to bring accusations against Danton and his adherents, including Camille Desmoulins, and, on April 5th, they were also brought to the guillotine, leaving Robespierre, with his companions, St. Just and Crouthon, in power. Robespierre, who desired to be at once high priest and dictator of regenerated France, introduced yet another religion, passing a decree recognizing the *Supreme Being* and declaring that the soul is immortal. On June 8th he took a lead in the great fête of the Supreme Being, which amused and offended many of his old friends. Finding himself far from being admired by them, he determined that the terror, which he had in some ways instigated, should go on again; the convention, however, resisted, and he withdrew completely from public life, leaving the reins of power in the hands of his terrible colleagues, who at once applied with the utmost ferocity the law by which suspected persons could be put to death with but the shadow of a trial. This was the time of what is called the Great Terror, June and July, 1794.

The reaction soon came. Opposition to Robespierre sprang up within the committee of public safety itself; and when on July 26th he demanded its renewed reorganization the convention for the first time dared to refuse him. His enemies at once made this refusal a pretext of turning against him, and in a single day almost his power was gone. On July 27th (the 9th Thermidor) his arrest and that of his chief supporters were agreed to. Instantly the commune of Paris declared itself in insurrection, the prisoners were rescued from the jailors' hands and carried in triumph to the Hôtel de Ville. But their success was only temporary. Robespierre's enemies won in the end a complete victory. The fallen dictator, after an unsuccessful attempt at suicide, was guillotined on July 28th, and with him a great number of the leading terrorists. With Robespierre's death the Terror may be said to have come to an end; the "Thermidorians," the Mountain who had caused this revolution, became a reactionary party, remodeling, if not overthrowing the existing government. The more moderate deputies of the convention who had fled or been banished, gradually reappeared in Paris. Under their influence the constitution of the year III. was framed, bearing throughout the traces of the return of an intelligent and responsible class to the conduct of public affairs. It was republican, of a modified type; it intrusted legislation to two councils—the council of the Ancients, 250 persons of forty years of age and upward, a kind of senate, who sanctioned the laws; and the council of Five Hundred, men at least thirty years old, who had the preparation and initiation in law making. The executive power was intrusted to a Directory of five members, under whom should be responsible ministers, and all the machinery of practical government. The general principles of the rights of men were reaffirmed. The convention at once accepted it, only taking care that the royalists should not be able to get hold of power by means of it. The latter made one determined effort (October 5, 1795) to overthrow it, but the convention placed their troops under the command of Napoleon Bonaparte, then a



young artillery officer, whose skill and iron resolution swept away all resistance.

During the latter portion of the Revolution and while these events occurred at the capital, the French army had won some successes in its war with the foreign powers. Prussia had carried on the war in only a half-hearted fashion during 1794, and had withdrawn from the coalition and made peace in April, 1795. Spain had concluded peace in July of the same year. Belgium had been overrun and taken possession of by the French. The Austrians, as well as the allied armies of England and Holland, had been gradually repulsed. Early in September the French army had crossed the Rhine, near Dusseldorf and penetrated to Frankfort, while another detachment had taken Mannheim. But this body soon met with a defeat which greatly tended to turn the tide; Mannheim was retaken and the army driven back. In France itself the Vendée was again in insurrection. Such was the state of affairs when, October 28, 1795, the new government began, the convention having been dissolved on the 26th. England, Russia and Austria, having formed a new coalition, began to carry on a more vigorous warfare. Happily for France the new directory proved very enterprising and war-like in foreign affairs, and thus secured the good will of the army. This was in large part due to the military genius and temper of Carnot, "the organizer of victory," who was one of the five. Bonaparte was put in command of the army which was now to advance against the Austrians from Italy. From this point on the history of France becomes merely that of Napoleon Bonaparte and his able rival and subordinate generals, and we refer the reader for the subsequent events to the articles NAPOLEON, HOCHÉ, JOURDAN, MASSÉNA, MOREAU, in this work. A few words will suffice to give the internal state of affairs in France during the reign of the Directory. The royalist party had been gradually gaining ground throughout the kingdom, and the Directory was constantly absorbed in the endeavor to prevent an upheaval, which in the prevailing condition of want and general bankruptcy, could not but put an end to its power, an outbreak constantly threatening both from royalists and the democratic party which had risen from the intrigues of the defeated Jacobins. In the elections of 1797 the royalists made such gains as to give them a majority in the council of Five Hundred; and this hastened the approaching crisis. The republicans found their support chiefly in the army, and with the aid of this, Bonaparte being on their side, they prepared and carried out a decisive movement. On the night before September 4th the hall of the council was surrounded by troops and cannon. The royalist members were arrested, and the remainder of the body pronounced a decree of banishment against them and declared their election illegal. Again the republicans were in power. Here the history of France becomes entirely identified for nearly eighteen years with that of a single man, and we refer the reader for this period of the consulate and the empire to the article NAPOLEON. From the downfall of the great Corsican the history of France can be again followed in the biographies of her rulers, of whose reigns a short review will be sufficient.

*The Restoration.*—While Napoleon had held together the enthusiasm of the French army, and had flattered the national vanity, and had raised a bulwark between the peasant tiller of the soil and his ancient oppressor, the Bourbons came back, having learned nothing, and under auspices painful to French feeling. Louis XVIII., the first monarch under the restoration, indeed, was no mere reactionary; he allowed little blood to be shed, and Labédoyère, who had led the army in its rally round

Napoleon in 1814, and Marshal Ney, were the only victims. Murat, taken in an attempt to recover his throne at Naples, was shot by the Italians.

In 1820 the extravagant conduct of the reactionary Bourbon princes of Spain and Italy had aroused insurrection and armed resistance everywhere. The people of Spain and Naples declared against arbitrary government, and were at once attacked by those "champions of order," the sovereigns of the holy alliance. At their bidding Louis XVIII. also declared war against Spain; the French Government being now entirely guided by the count of Artois, who was thoroughly in harmony with all that was repressive and reactionary in Europe. The triumph of the French arms was mercilessly used to crush the Spanish liberties. At the death of Louis XVIII. (September, 1824), reaction ruled supreme in France; the Jesuits were conspicuous in their delight, and the system of influences, corruption, and maneuvers, so long the disgrace of French elections, had sprung into full bloom.

Louis' brother and successor, Charles X., carried his reactionary inclinations so far that a formidable insurrection broke out against him (July 27, 1830). He was obliged to abdicate, and after a few day's interval the head of the younger branch of the house of Bourbon, Louis Philippe, duke of Orleans, was appointed "king of the French" (August 9th) by the chamber of deputies. "The days of July" were hailed as heralding a new epoch of moderate politics; the "citizen king," who had carefully shunned the reactionary party, and who was by family tradition head of the liberal branch of the Bourbons, was expected to lead France along a course of decorum and material prosperity. It should be the reign, not of noble and priest, nor of grim artisan and sans-culotte, but of broadcloth burgher, a rule of common sense and constitutional use. But by degrees the liberal policy of Louis Philippe was changed; the government proved reactionary at home and devoid of energy abroad; and the popular favor on which it had relied, deserted it. The agitation of the country at first not seen was chiefly apparent in speeches made at banquets. When the session of 1848 opened, the opposition showed itself strong and resolute; the interference of government (February 22d) against a popular banquet in Paris led to the outbreak of the Second Revolution.

*Second Revolution.*—Although the nation would have preferred the continuation of a liberal, constitutional monarchy, the irresistible course of events precipitated them into a republic. On February 23d the national guard took part with the populace against the troops, and the soldiers, unwilling to attack them, hesitated, and the day passed by; but in the evening the troops were irritated in some way and fired on the mob, killing a few men. The excitement grew worse, it was too late that Louis Philippe called on Thiers to form a liberal ministry. The people with the national guards marched on the Tuileries. The "citizen king" now abdicated in favor of his grandson, the count of Paris, and closed an inglorious reign by inglorious flight. He reached England and died there in peace some two years later. In the chamber of deputies the republican party at once took the command and established a provisional government, which immediately proclaimed a republic, to be ratified by a popular vote, to be based on the sovereignty of the people, and to secure a pure and liberal administration. On December 10, 1848, Louis Napoleon Bonaparte, the nephew of Napoleon I., was elected president of the French Republic for a term of four years, by 5,434,226 votes, against about 1,450,000 given to General Cavaignac, (*q. v.*)

The first act of the new government was the overthrow of the Republic of Rome and the temporal restora-



tion of Pius IX. By this the president declared himself hostile to all the liberal movements of Europe, and won the firm allegiance of the Catholic clergy of France. Before Louis Bonaparte had been in office a year, it was seen that he was preparing to move in the direction of absolute power. Stormy debates in the assembly took place; a law was passed limiting the suffrage, as it was seen that in the existing temper of the country the ignorant peasant vote was at the mercy of adventurers. Discussion also followed as to a revision of the constitution of 1848. At last, on December 2, 1851, the prince-president, guided by a group of friends and brother conspirators, ventured on his famous *coup d'état*, and swept away the whole existing fabric of the constitution. In the most lawless manner, sixteen prominent members of the assembly were arrested, among them Cavaignac and Thiers; the assembly was forcibly dissolved, universal suffrage restored, and a *plebiscite* on the new form of government was appointed to follow at once; the capital was placed in a state of siege, the council of state dismissed. The support of the army had been previously secured, and various unconcerted attempts at armed resistance smothered by bloody measures. The president alone controlled the elections, was chosen for a term of ten years by 7,439,216 votes; a new constitution was promulgated, and finally, on November 7, 1852, the senate made a motion for the reestablishment of the empire; this having been assented to by a vote of 7,824,129 citizens, the empire was proclaimed December 2, 1852, and Louis Napoleon ascended the throne with the title of Napoleon III., hereditary emperor of the French "by the grace of God and the will of the people."

*The Second Empire.*—The second empire lasted from November 4, 1852, to September 4, 1870, a period of nearly eighteen years. When it began, the sovereigns of Europe thought that republicanism was gone forever; they recognized the new government of France with some cordiality.

In 1854 began the first war of the second empire. The large and ambitious schemes of the Czar Nicholas against Turkey, "the sick man" of that day, alarmed all Europe; the dispute between Russia and the Porte as to the holy places was brought before a conference at Vienna, which proposed to solve the difficulty on the lines of the treaty of 1841, which had placed Turkey under the guarantee of the five great powers. Before diplomacy had got to work, the Russians had invaded the Turkish territory. War, however, did not openly break out till the spring of 1854. In April a treaty of alliance was signed between France and England, who afterward were joined by the king of Sardinia, while Austria and Prussia also guaranteed the possessions of each other; the imperial guard was reestablished, and an army of 60,000 men, one-third English, two-thirds French, set sail for the Black Sea. The conduct of the war by the French Government largely increased the military prestige of the nation, as well as the popularity and strength of Napoleon's rule. On March 30, 1856, peace was concluded with Russia, France coming out of the conflict with the prestige of the first military power of Europe, and acquiring at the same time great diplomatic influence. For the marriage of Louis Napoleon, the birth of the crown prince, and the attempts at the emperor's life during these years, the reader is referred to the article NAPOLEON III.

The affairs of Italy now began to occupy attention, and Napoleon's determination to interfere in Italian matters against the Austrian Government, first intimated in January, 1859, led to the declaration of war against Austria in May of that year. France was again successful, but the treaty of Zurich, by which the peace of Villafranca (July 11, 1859,) was ratified in October of

the same year, satisfied no one. Austria was humiliated by it; Italy disappointed, in the very moment of hope and triumph; Germany and England deemed both the war and the peace a high-handed proceeding; and France herself, in spite of the successes of the army, wished that the high-sounding promise of her emperor, "Italy free, from the Alps to the Apennines," had been more nearly fulfilled. In 1860 Savoy and Nice were ceded to France by Italy, an act which excited among the other European powers the greatest suspicions of Napoleon's designs.

During these years France had also been engaged in distant expeditions; a Chinese war, in alliance with England, occupied her from 1858 to 1860; the capture of Peking brought the war to an end. In Cochinchina, also, France had Spain for an ally, and closed an obscure if successful war with a treaty of peace in 1862. The Syrian expedition of 1860, undertaken in harmony with the other Christian powers, speedily reduced the sultan to reason, and a French occupation, which lasted till June, 1861, did much to relieve the oppressed Christians of that part of the Turkish dominions. The French successes in the east were counterpoised by an ignominious failure in the west. Napoleon's scheme of establishing archduke Maximilian of Austria, on the throne of Mexico, ended in a terrible disaster for the archduke in 1867, and discredit and loss to the imperial government. It was seen by the elections of 1863 that, while the peasant vote remained true to Napoleon III. the towns, following the leading of Paris, and in spite of all official efforts, sent up a strong majority to the opposition. It was clear that the educated and thinking part of France was already weary of the second empire. The course which Napoleon pursued during the Prusso-Austrian war in 1866 did not tend to restore confidence in him. The year 1867, although the international exposition (which opened in the spring in Paris with great splendor) made it outwardly appear a prosperous period for the French Government, was in reality a time of sharp political struggles at home and complications abroad. Among the latter it was especially the Roman question which tended to increase the difficulty of Napoleon's position. In 1866, after a convention with Italy, the French troops withdrew from Rome, while Victor Emmanuel promised not to molest the pope. There came, however, to Rome a French legion, composed of volunteers, chiefly old Bourbon partisans, commanded by a French general and officers of the French army. Italy looked upon the presence of these mercenaries as a violation of the convention, and, when Garibaldi with his volunteers, in 1867, tried to gain entrance into the eternal city, did not take any steps to prevent him. The emperor, however, with unlucky zeal, after much hesitation, dispatched General de Failly with a strong force to succor the pope, and thus placed himself openly in antagonism with Italy.

The French and papal troops defeated the Garibaldians at Mentana (November 3, 1867), and Italy regarded herself as thenceforward free from all obligation of gratitude toward imperial France. On the other hand, the clerical party loudly complained that the emperor had but half done his work, and grumbled because he had not used his victory to restore to the papacy its lost territory. Thus Napoleon III. lost the favor of both sides, and left on men's minds the impression that he was a weak and irresolute ruler. Nor did he better his reputation by the purchase of Luxemburg from Holland (1866-1867). For the intervention of Prussia defeated all his plans, and although the fortifications of Luxemburg were demolished, and the Prussian garrison withdrawn, it was felt that the emperor's attempt



to strengthen his northeastern frontier had completely failed, and that the antagonism between France and Prussia must one day lead to trouble.

The growth of public opinion against the emperor and his ministers was most conspicuous during the year 1868, when Thiers was listened to with great interest when he demonstrated the hollowness of imperial finance, the terrible burden of debt, the growing dimensions of the army expenditure, which was not accompanied by any real increase in the fighting strength of the nation. The elections of 1869 showed the quick growth of the opposition, for from the old unanimity, the imperial government did not obtain quite three-fifths of the votes, and again the large towns returned republican candidates. In this assembly Léon Gambetta made his first public appearance among the "irreconcilables." After many liberal professions, the emperor once more appealed to the country for a vote of confidence in himself, and in the hereditary character of his government. The reply of France seemed to be overwhelming and decisive,—7,358,786 Yes, against 1,571,939 No. This vote was taken on May 8, 1870; within two months the Hohenzollern question had begun its ominous course.

In 1868, the Spanish insurrection of September had driven Queen Isabella from the throne. She took refuge in France, with a crowd of partisans, and became at once the favored guest of the emperor and his Spanish spouse. In the provisional government of Madrid, General Prim in 1869 became president of the council of ministers, and began almost at once to search about Europe for an eligible king. He finally offered the crown to Prince Leopold of Hohenzollern-Sigmaringen, who at once informed the head of his house, the king of Prussia, of the fact, and the king authorized him to accept the offer. France had not been formally informed of General Prim's choice, and the imperial government thought it necessary to intervene. Prussia and France had regarded one another with distrust for years; in the beginning of the imperial rule the Prussians had stood aloof; the irritation which France felt at the Danish war, passed into alarm after Sadowa. The failure of Bendetti's negotiations in 1870 with Bismarck, as to Belgium, added to the tension. The French Government was also uneasy at the evident signs of opposition at home, the decay of its popularity, the penalty of its corruption and extravagance; finally, there existed two courts, that of the empress and a more patriotic one, which dimly reflected the ancient antagonism between a Spanish party in high place and the true interests of the country. The emperor of the French, worn out and more irresolute than ever, became the prey and victim of a faction. When Prince Leopold, on learning of the objections of France, withdrew his candidature, the French Government refused to accept the act in a conciliatory spirit. The empress and her friends wanted war, and consequently the king of Prussia was pressed, as a further step, to give assurance that he never would support Prince Leopold in any future candidature for the Spanish throne. This was equivalent to saying that war was determined on, and the Prussian cabinet made no further effort for peace. While the liberal party in the French chamber and in the country, headed by Thiers, persistently opposed the war, the Bonapartists fiercely pushed matters on; they refused the good offices of the other states of Europe; in shameful ignorance they declared that every thing was ready, and were only eager to begin.

France had no allies; her appeal to South Germany failed; Austria, however friendly, was paralyzed by Russia; and the people of the lesser German states, whatever their governments might think, were favorable

to Prussia, who seemed to them the upholder of a national cause. At Paris, the profoundest ignorance prevailed. Nothing was known of the state of feeling in Germany, or of the real condition of the Prussian preparations for war. The French army was ill-organized, ill-supplied, and without proper reserves, while the incapacity of its leaders was appalling. No one knew anything of strategy; maps and plans were bad; even the employment of railways in war had never been properly studied; bravery there was in plenty, but leading and management were absolutely wanting. The French army was stretched across the frontier-line looking toward Germany from Strasburg to Metz; Metz became the French quarters-general, Mainz the German. By August 2d, the hostile armies came into collision; the emperor's reconnaissance drove the Germans out of Saarbrück on that day. This was the one and only success of the French arms across the German frontier; for on that same day General Douay was attacked and defeated at Wissembourg, and his position forced. Attacks followed sharply; on the 6th, MacMahon was driven in at Wörth, and on the same day Frossard was defeated at the other end of the line. Before Paris had recovered from her delight at the trivial success of Saarbrück, the ominous telegram, "Tout peut se rétablir," awoke her to a true view of the state of things. It was soon seen that the emperor was unfit to command; there was neither strategy in detail nor a definite plan of campaign; having let in the invasion, he resigned the post of commander-in-chief into the hands of Marshal Bazaine, who withdrew into Metz. The forward movement of the Germans soon alarmed both him and Paris, and then he decided (August 14th) to retire to the camp at Chalons, where Marshal MacMahon was in command. At this very time the Prussians and their allies were closing in on Metz; on the 14th at Borny, the 16th at Gravelotte, the 18th at Saint Privat, tremendous battles, in which the attacking Germans did not always get the best of it, hemmed the French in, and Bazaine withdrew with his large army into Metz. The French view of his conduct is that he meant to keep his army intact, in order that, afterward, in conjunction with the Germans as his accomplices, he might secure, with a fresh military *coup d'état*, the imperial rule over France. Whatever he may have meant, the Germans had no intention of intrusting the fortunes of France to him. At this time General Trochu, an able soldier, whom the empress did not like, was appointed governor of Paris; the army of MacMahon was at Chalons intact, and a prudent ruler would have made these two strong forces act in concert. The empress, on the contrary, refused to hear of the emperor's return to Paris, and ordered MacMahon to march to the Belgian frontier, to take the Prussians on the flank, and to relieve Bazaine at Metz. The northward movement ended speedily in the great catastrophe of Sedan (September 1, 1870). On the 2d, the emperor, with an army of more than 80,000 men, was the prisoner of war of the king of Prussia.

*The Third Republic.*—On September 4, 1870, the Third Republic was proclaimed at Paris, with a government of national defense, of which the chief members were Thiers, Jules Favre, Jules Simon and Léon Gambetta; General Trochu was its military head. The Germans gradually closed in on Paris; no serious resistance being possible, as one-half of the available army of France lay in Metz, and the other half was either destroyed or prisoners at Sedan. The first siege of Paris lasted from September 19, 1870, to January 30, 1871, during which period also the temporal power of the papacy came to an end (September, 1870), for it fell with the imperial cause, which alone had held it up;



and in December, 1870, the king of Prussia was proclaimed emperor of Germany at Versailles. While Paris held out bravely, Gambetta, at Tours, made incredible efforts to raise fresh armies for France; the old hero of Italy, Garibaldi, also appeared, now that imperialism was gone, and placed his sword at the disposal of the struggling republic. But all to no avail. Before the end of October the capitulation of Metz had released a whole German army, which protected the operations of the besieging hosts. At last, on January 28, 1871, an armistice was announced, which brought the despairing resistance of Paris to an end. The war elsewhere died out almost at once; the Germans occupied all the forts round Paris.

On February 8th, elections took place for a national assembly, to be held at Bordeaux, to deliberate on the question of peace or war, or rather to arrange the terms of peace—for the country returned the assembly with that intention. It was a body nominally republican, with strong monarchical tendencies; hardly half a dozen Bonapartists were returned to it. The new government of France had M. Thiers as president of the republic, and M. Grévy as president of the National Assembly; and it was decided that the assembly should sit at Versailles. The fierce outbreak of the hot republicans of Paris interfered sorely with their peaceful labors. On March 18th, the commune of Paris declared itself in opposition to the Versailles republic; the old grudges of artisan Paris once more asserted their unpleasant existence; and Marshal MacMahon was instructed by the Versailles assembly to reduce the insurgent capital. Then followed the second siege of Paris, from April 2d to May 21st, with its accompanying horrors, and the gloomy spectacle of street-fighting and the burning and ruin of the public buildings of the town. Meanwhile, M. Thiers, with infinite toil and with journeys from court to court of Europe, had at last succeeded in getting terms of peace agreed to. The treaty of Frankfurt was signed on May 10, 1871; by it Alsace and a large part of Lorraine were ceded back to Germany, while Belfort was restored to France. An indemnity of 5,000,000,000 francs was to be paid to Germany for the cost of the war.

Early in April, 1873, on the resignation of M. Grévy, president of the chamber, the majority of the assembly elected their candidate, M. Buffet, over the Thiers nominee; the majority consisted of all the adversaries of the republican government, Bonapartists, Orleanists and Legitimists. In May these parties declared a want of confidence in Thiers by a vote of 360 against 344. Then M. Thiers resigned, and the parties which had arranged their plans beforehand at once elected as president Marshal MacMahon. At the beginning of 1875 it was agreed that the presidency should be for seven years, and a new constitution, with radical republican tendencies as much as possible effaced, was ratified in February, 1875. But the republican party made constant progress, and achieved great success at by-elections, strengthening itself so far that it could now hold its own in the chamber. In spite of shameless interferences with elections, in spite of the unseemly appeal of the president himself, in spite of threats and all the usual weapons of reaction, the country was so decidedly republican that even the death of Thiers (September 3, 1877,) could not for a moment check the fortunes of the party. The election of 1877 returned a decisive majority for the republicans, now headed by MM. Grévy and Gambetta. The marshal-president, after France had been deeply agitated by rumors of a new *coup d'état* and by ominous movings of troops, at last gave way, and honestly and reluctantly accepted the new order of things. The senate was the

only place where the reactionary parties still had great influence, but the election of 1879 happily brought that body in harmony with the chamber of deputies and the country.

For the last ten years the French Republic has enjoyed comparative peace at home and abroad. The reactionary parties gradually awoke to the fact that the majority of the French nation favored the republic, and that their chances of eventual successes were rapidly diminishing. The Bonapartists lost their mainstay by the death of Louis Napoleon, the son of the last emperor, and the royalists had to bewail the loss of their favorite candidate, the count of Chambord. One man at the present time threatened, more than all monarchical pretenders, the peace and stability of the country, and for a time a new *coup d'état* was feared, but the elections of 1889 also averted this danger. We speak of General Boulanger, who first made himself conspicuous as Minister of War under President Grévy, when he effected many military reforms. His popularity chiefly rested on those. He was regarded by the common soldiers and the peasantry as the creator of an army that was capable, or soon would be, of avenging Sedan, and in his speeches he hinted vaguely at war. The dissatisfied factions in France, mainly monarchists and socialists, were the general's ardent supporters, although he called himself a democratic republican. He was presented for the first time as a candidate for the chamber in four departments in 1888, and was elected in the Nord by a majority of 100,000, the Bonapartists and republican extremists being strong in that part of the country. He made his appearance in the chamber on June 4th, and began at once the course of a swaggering, unscrupulous demagogue. Expressing a Platonic belief in the radical plan of abolishing both the senate and presidency, he proposed, as a practical solution, the election of the senate by universal suffrage, the submission of laws to a referendum, and the election of the president directly by the people, who desired to have a visible head of the government. M. Floquet, president of the chamber, described the scheme as veiled Cæsarism, and alluded to one of Boulanger's manifestoes, in which he said the people must be cared for like a child. The controversy between General Boulanger and M. Floquet led to the former's resignation of his seat in the chamber, and finally to a duel, in which the fire-eating soldier was severely wounded by the dignified civilian.

In spite of the humiliating result of the duel, General Boulanger was again elected on August 19th, in the Nord, the Charente-Inférieure, and in the Somme with large majorities. When he took his seat in the chamber in October, there was at once a renewal of disquieting popular agitation, and on October 30th the government ordered the police to seize pictures that were sold in the streets representing General Boulanger driving out the deputies from the chamber, and portraits, likewise in uniform, of the Comte de Paris and Prince Victor Bonaparte. Up to the elections of 1889 the Republic seemed to be exposed to grave danger from Boulanger and his adherents, but this last election destroyed the prestige of the military politician forever. The overwhelming defeat General Boulanger suffered in 1889 assures us that the republic is now firmly established for many years, and that France will maintain her existing form of government intact.

*French Language and Literature.*—Through Latin, its ancestor, French belongs to the Aryan stock of languages. Along with its sister languages, Roumanian, Italian, Spanish, and Portuguese, it sprang into being when soldiers, colonists, and merchants, in the course of several centuries of Roman domination, had saturated western and southern Europe with their *lingua romana*



*rustica*, or common Latin speech, an essentially popular and unliterary form of utterance, but forcible and instinct with an irrepressible vitality. This Latin of the Roman people and of their European possessions is known to philologists in the shape it received after the invasion of the barbarians and through the admixture of Teutonic elements, under the name of Romance. In France Romance gave birth to Old French; which can be divided into three successive periods—the period of formation, the flourishing period, and the period of decay.

The *lingua romana*, according to a law inherent in every language, was already assuming local peculiarities in different parts of Gaul when the first move toward the formation of a French language, the campaigns of Julius Cæsar, was completed by a second, the settlement in Gaul of the Frankish, Burgundian, Saxon, and Gothic tribes from beyond the Rhine. The formation of different dialects received fresh impetus from the complete disruption of the Roman power in the West. From that day, the processes of decay, which till then must be considered as modifications within the *lingua romana*, assumed a regenerative character and became the starting-point of a new language. To the Franks has fallen the honor of having their name attached to it. This Germanic title has by no means affected the inner construction of the language. Language in Gaul, as elsewhere, ran into types: dialects, whose primary causes are obscure, were formed. Nowadays Provençal is for the people a patois, for literary, antiquities and philologists a curious study. Its vic or the *langue d'oïl*, the parent of modern French, has had a triumphant career. Geographically, to it belonged the valleys of the Saône, Loire, Seine, Scheldt, and Meuse. Scholars recognize four dialects in it. The dialect of Paris became paramount after the building up in Paris under the Capetian kings of a natural center for the gradual nationalization of France. The culminating point of Old French was reached when it had evolved fully its "half synthetic system" in the twelfth century.

The language thus shaped brought forth a stupendous amount of literature. For two centuries medieval French was the polite language of Europe, more so than modern French has ever been; for after the early but transient literary outburst of the *langue d'oc*, and before the dawn of the Italian Renaissance, French had no rivalry to fear from still shapeless contemporaries. Thus rough-hewn, French society, from the eleventh to well into the fourteenth century, assumed and preserved throughout the Crusades, throughout the struggle between emperor and pope, in spite of the annexation to England for a time of a large portion of France, the proud position of master and arbiter in matters of the intellect and of social commerce. The deeds of war of the Frankish kings of the Merovingian and Carolingian dynasties called forth French epic poetry. The appearance of Clovis as the champion of the Catholic faith against the Arian heresy, of Charles Martel as the protagonist of Christendom against the Moslem Arabs from Spain, of Charlemagne as conqueror of the heathen Saxons in Germany and of the Mohammedans on the banks of the Ebro, fed an ever-swelling strain of song till it rang its loudest in the *Chanson de Roland* (eleventh century).

In the middle of the thirteenth century the purely epic cycle and the romantic cycle engrafted upon it were complete.

Whole collections of fables were fathered upon Æsop, dubbed to that purpose with the familiar name of Isepet. By degrees the short fable was succeeded by long semi-epic, semi-satirical compositions, in which a moral was aimed at man by the transference of social relations to the animal world. The French have to thank the Crusades for their first histories. Some of these belong

to Anglo-Norman literature, and recount the deeds of France's ally, Richard Cœur-de-Lion. History in the middle ages being heroic, epic, and chivalrous, rather than didactic and philosophical, the aristocrats provided the clerics with the material and spirit of its treatment. But as time wore on the latter in their turn enriched French literature with branches that are entirely their own. Their most important contribution to general literature is the *Roman de la Rose*, a vast allegorical treatment of the lover's woes and the lover's bliss in the pursuit of the object of his passion.

Lyrical poetry has, properly speaking, no cradle of its own within the strict limits of French medieval literature; for it was brought thither from a sunnier, warmer and softer southern air. Italian, Spanish, and the *langue d'oc* were the natural and early vehicles of lyricism in Europe. Of these three languages the last named was the first to bear fruit.

The fifteenth century witnesses the linguistic transformation of Old French into Modern French. The last traces of case inflection disappear, the analytic form of language supersedes in all essential parts the half-synthetic system. Froissart, in his *Histoires*, wields an inquiring as well as a picturesque pen. His successor, Philippe de Comines, the historian of Louis XI., is still more of a moralist and of a politician. Charles d'Orléans, snatching from the perishing troubadours the thread of lyrical poetry, passed it to Villon, who wove into its silk many a coarse hempen filament, till Clement Marot raised French verse to religious solemnity in his translation of the Psalms. In the meanwhile the Italian Renaissance was filing with its glory the world of art and of literature. With the accession of the House of Valois to the throne we find that the spirit of France has passed away from the old into a new society and a new literature. French society becomes polished, its local provincial centers die out, and culture flourishes in the court of the king. Francis I. is proclaimed the father of letters. It became the fashion at court to show enlightenment by attending the preachings of the Reformers. Francis I. laid the foundation of the Bibliothèque Nationale and of the Collège de France. He, and his sons after him, encouraged artists and scholars. Paris numbered then 500,000 inhabitants, of whom 15,000 were students.

In the general excitement of the Renaissance and the Reformation, literature could not but move in the same direction as society at large. Ronsard and his *Pléiade* stood in the van of this movement, which Régnier endeavored to stem, while Rabelais, came near being the burlesque Shakespeare of his age. No two minds could be more different than those of Rabelais and Montaigne, the great prose-writers of the sixteenth century, yet only the Renaissance could produce either. Rabelais, Montaigne, Calvin, and Descartes, by setting French prose on the basis afforded by the revival of learning, drew to themselves some of the attention then given to Italy. Poetry was rescued from Ronsard's exaggerations by Malherbe only to be tapered down almost out of existence by over much attention to elegance, refinement, lightness, and style. As for the professed lyric poets of the seventeenth and eighteenth centuries, their performance bears the impress of the sterility and rhetoric of their Latin models. J. B. Rousseau, Lefranc de Pompignan, Lebrun, and Pindare are worse sinners in this respect than Racan, Chaulieu, and Parny. Lyricism finds better interpreters in church orators, such as Bossuet (*Oraisons Funèbres*), Bourdaloue, Massillon, and Fléchier, all of the seventeenth century. It pervades the glowing pages which love of nature and effusion of sentiment dictated to J. J. Rousseau and Bernardin de St. Pierre in the latter



part of the eighteenth; it dwells in the religious fervor of Chateaubriand and in the passionate enthusiasm of Madame de Staël on the threshold of the nineteenth. André Chénier was the first to restore some soul to poetry, in the pure Greek note which he sang during the horrors of the Revolution.

Such a long eclipse is partly explained by the premature application to literature of standards of taste and of formal criticism. Malherbe subjected his talent to a personal discipline which Boileau consolidated into a set of rules enforced with the lash of satire. Corneille wrote his tragedy early enough to remain comparatively free from this rod, but Racine acknowledged Boileau as his master. The seventeenth century is in France the age of authority in literature as in everything else. The French Academy, founded by Richelieu in 1635, to establish positive rules for the French language and to render French speech not only elegant, but also fit to present all arts and all sciences, gave an earnest of its future labors by an endeavor to curb Corneille's waywardness in composition. After Corneille's sublimity and his representation, not without some Spanish staginess, of the conflict of duty and passion in heroic human breasts, came Racine's polished and courtly expression of the agitations of the heart. Molière, the greatest French painter of men from life, showed himself, in his *Tartufe*, the scourge of hypocrisy; in his *Misanthrope* he was austere and touching; in the *Femmes Savantes* and in the *Précieuses Ridicules* he exposed the false and pedantic erudition of the woman of the period; in the *Avare* he related the plight of an unconscious miser. Regnard followed him, but far behind. Then came Destouches, LeSage, Piron, Gresset, Sedaine, without Molière ever having a rival, except, perhaps, Lafontaine. Florian followed in his footsteps at a respectful distance. Madame de Sévigné gained a place for letter-writing as a distinctly French art, an accomplishment in which many Frenchwomen have excelled after her. In contrast to Bosseut's Hebrew-like eloquence and militant ecclesiasticism stood Fénelon, gentle, suave and versatile. Totally different from either of them had been Pascal, an introspective pessimist oddly placed in the vestibule of an impersonal age, wrestling with doubt, bending the language to his intellectual agony, and planting upon the Jesuits the stigma of his satire. La Rochefoucauld, who wrote his contribution to moral philosophy before La Bruyère, was also a memoir-writer, a gift in which Cardinal de Retz, the naturalized Scotsman Hamilton, and the Duc de St. Simon all excelled.

French literature offered, toward the end of the long reign of Louis XIV., a spectacle of imposing intellectual force. The age of Louis XIV. was, above all things, that of a well-balanced literature, the work of men whose nerves are not upset, who are fully satisfied with the work suggested by their situation. Their stock of ideas was adequate to their power of treatment, and nothing came to mar the dignity and gravity with which they approached their subjects. There is a wholesome moral tone underlying their performance, and the kind of repose bred from the illusion that one's work is final. But Louis XIV.'s senility and fanaticism, and after him the license and unscrupulousness of the regent, disorganized the court; a larger number of thinking and able men collected in Paris than the service of the state and of the church could occupy. Literature, from being an art in itself, became subordinate to ideas; by an enormous influx of ripening thought it became a vehicle for hitherto unexpressed political, moral, religious and scientific matter. Till 1750 the disintegration of the old social prerty demained latent. Still, Montes-

quieu's *Lettres Persanes* and his *Considérations sur la Grandeur et la Décadence des Romains* announced plainly enough the advent of social satire, and the application of philosophic method to the study of political history. But his *Esprit des Lois*, by showing the interdependence of physical and moral laws, and the conditions to which is subjected the legislator's apparent liberty, marks a clear departure from the traditional theories of government.

The great mouthpiece of the spirit of the age, Voltaire, belongs still in pure literature to the times of Louis XIV. His tragedies are classical, his literary criticism is that of Boileau, his poetry is an academic display of wit and sociability; but the remainder of his works form a complete battery, in which his tales represent the light artillery and his histories the heavy guns. He was assisted in his incessant warfare by a host of talented and original thinkers. Sensualistic followers of Locke, like Condillac and Condorcet; combative materialists, like Helvetius and D'Holbach; encyclopædists, headed by Diderot and D'Alembert; earnest moralists like Vauvenargues; writers of novels and plays with a purpose, such as Le Sage and Beaumarchais, or with the object of minute psychological analysis, such as Marivaux and l'Abbé Prévost; naturalists, like Buffon and Bernardin de St. Pierre, showed each in his own department of letters, art, or science, many even in several departments at once, one common spirit and an identical zeal by which all thinkers and writers, often unknown to themselves, worked in concert as if holding of malice prepense an intellectual Pentecost. The age was too much in earnest for plain comedy; it was too bitter for poetry; Gilbert almost alone wrung a true cry from his heart; Crébillon writes some overwrought tragedies, and Laharpe stands forth as the last critic of the Boileau school.

At this juncture J. J. Rousseau appeared to complete Voltaire. Born in Geneva, where the political institutions toward which France was moving were partly in existence, early weaned from an atmosphere still nominally Calvinistic, professedly at war with the philosophers, he gave them the support of his persuasive eloquence, and raised the nation's pulse to fever-heat, till even Rousseau's voice was lost in the clamor of the Revolution. He broke fresh ground in the science of politics by his *Contrat Social*, in the art of education by his *Émile*, in pure literature by his *Nouvelle Héloïse*, painting a picture of more natural morals, often greatly at variance with morality. In the year after his death the political assemblies began the realization of his ideas. Thus literature, at work among other causes, led straight to the Revolution. The ring of Mirabeau's oratory was heard for a few years above the turmoil in which perished the poet André Chénier.

As long as the ax did execution in France, and as long as Napoleon's sword held sway in Europe, literature did not raise its voice. Madame de Staël drew her inspiration from without, though mentally and emotionally in touch with J. J. Rousseau. She called the attention of France to the benefit it could derive from the study of independent foreign literature, such as the nascent literature of Germany and the established literature of England.

By doing away with every sort of restriction and privilege the Revolution imparted a new unity to the French nation, immensely developed the function of the middle class, and threw open vast prospects to its hopes and ambitions. Becoming the center of gravity of the nation, and holding in its hands the reality of power, it reëchoed the ideas of Madame de Staël. Chateaubriand, finding in a return to medieval ideals the proper food for his imagination and the right colors for his



style, unwittingly favored her liberalism. Then Lamartine stepped forth as the lyrical poet long looked for in vain, revealing in his reposeful, tuneful lines, a beautiful and sympathetic side of French poetic sentiment which had never yet found a mouth able to utter it. A whole school of lyric poets followed in Lamartine's footsteps—Alfred de Vigny and Victor de Laprade being among the greatest. Casimir Delavigne is not free from the besetting sin of rhetoric, and Victor Hugo was master of too many instruments besides the lyre to be classed here. His position is that of founder and head of the French romantic school, as the men call themselves who threw off all allegiance to the classical traditions. He philosophized for his followers on romantic æsthetics, explaining what relation ugliness bears in art to beauty. He applied his doctrine in a series of dramas, to one of which, *Hernani*, the romanticists nailed their colors and compelled the public to bow. From 1830 to 1885 Victor Hugo was in all kinds of literature, at first an initiator, then a revered and victorious chief, and during his old age an idolized master.

Romanticism represented three things: a return to ideals medieval, a recoil from ideals classical, and the awakening of modern France to its own ideals. Victor Hugo embodied all this in his long career. Royalist and Catholic at first, he sang odes to the past; adversary of the Academy and of the Théâtre Français, he gained seats in the first for his followers and the boards of the second for his and their dramas. Then, interpreting the inner life of the bourgeoisie, he wrote for them the poetry of their daily musings, of their affections, of their children. Next, led on to liberalism and to the breadth of human charity, he with one hand branded Napoleon III., with the other revealed what gleams of spiritual beauty shine unknown in the hearts of the lowest and poorest, while his imagination wrought into epic poems the history of the world and the destiny of man. Sainte-Beuve applied the theory of the new practice with so much success that the critique of art and literature, always a favorite pursuit with the French, but long a cause of weakness, became one of their strongest points, and most beneficial to all literature. With him, Villemain, and Scherer, literary history became comparative as well as personal. Lamartine was an orator and a historian as well as a poet. Victor Hugo was still more discursive. Poetry became more and more of an art and less and less of a substance, except in Alfred de Musset, who rivaled the finest performance of Lamartine and Victor Hugo without sacrificing his originality to either. Below him stand the Parnassian poets, Leconte de Lisle, Baudelaire, Sully-Prudhomme, François Coppée, and, among his minor contemporaries, the satirists Barbier and Barthélémy, Brizeux, the two Deschamps, the ultra-romanticists Gérard de Nerval and Théophile Gautier.

The drama, to which Casimir Delavigne, Alfred de Vigny, and Alexandre Dumas laid stepping-stones for Victor Hugo, fell after him into the hands of the semi-classicist Ponsard, of Augier, Feuillet, Alexandre Dumas fils, and Sardou. The comic stage, occupied by the rapidly-constructed and rapidly vanishing productions of Scribe, only seldom saw a real comedy. But as a set-off some of the old comic force entered now and then into the romantic drama, and trickled into many novels and romances. Novels are fantastic with Ch. Nodier, historical with Alfred de Vigny, realistic with Mérimée, Balzac, Flaubert and Daudet, panoramic with Alexandre Dumas the elder, homely with Sandeau. George Sand, possessed like Madame de Staël of almost masculine gifts, and, like her, one of Rousseau's disordered kindred, exhibited in herself and

in her books the play of the passions in their natural state, till she poured forth her mellowed ardor in pure idyls of country life. There is but a distant affinity between the "realism" of some of the preceding writers and the naturalism of the brothers De Goncourt, Zola, Guy de Maupessant, and Paul Bourget. A wave of liberalism in the Roman Catholic Church bore Lamennais, Lacordaire, and Montalembert to oratorical fame, while Renan shone in church history, Cousin and Auguste Comte in philosophy, Taine in scientific psychology. Béranger stood almost alone in having but one specialty. A liberal, though under the spell of the Napoleonic military glory, he raised to an art his turn for penning popular songs. A. Thierry with fidelity and picturesqueness, Guizot with some heaviness, Thiers with patriotic complacency, Quinet and L. Blanc with too much passion, Michelet with an excess of the poetical faculty, De Tocqueville with breadth and insight, attached their names to some masterly work.

In France more than in any other country mental power is accompanied by the literary faculty. Hence all science and manner of erudition claims a place in literature. Their literature is marked by symmetry and fullness in its successive periods, by continuity in its unity and variety, by evenness in its distribution over the pursuits of man, by regularity in its function toward society, by the amenableness of the people to its influence.

The periodical press of France is a great force in the daily life of the urban population, and nowhere attains to greater importance than in Paris. As a political power the newspapers of the capital have played a leading part in the manifold changes of governments, dynasties and ministries. The illustrated papers and magazines are of a high order of excellence.

FRANCE, ISLE OF. See MAURITIUS.

FRANCESCA. See PIETRO DELLA FRANCESCA.

FRANCESCHINI, BALDASSARE (1611-1689), a painter of the Tuscan school, named, from Volterra the place of his birth, Il Volterrano, or (to distinguish him from Ricciarelli) Il Volterrano Giuniore. He is reckoned among those painters of the decline of art to whom the general name of "machinist" is applied. He is not to be confounded with another Franceschini of the same class, and of rather later date, also of no small eminence in his time—the Cavaliere Marcantonio Franceschini, who was a Bolognese (1648-1729).

FRANCHE COMTÉ, from 1674 till the great Revolution one of the provinces of France, was bounded on the east by the principality of Montbéliard or Mömpelgard and Switzerland, south by Bresse, Bugey and Gex, north by Lorraine, and west by the duchy of Burgundy and Champagne. It lay to the west of the Jura, and included the valley of the upper Saône and the greater part of the valley of the Doubs. In earlier history it is usually called the countship of Burgundy or Upper Burgundy; in later French history, on the other hand, it is frequently mentioned as the countship (la comté) *par excellence*.

FRANCHISE, in law, means some right or privilege, of a local or exclusive character, *e.g.*, the right of free fishery. The term is more particularly applied to the right of voting at an election for a member of parliament. See PARLIAMENT.

FRANCIA, a celebrated Bolognese painter, was born toward 1450, and died January 6, 1517. His real name was Francesco Raibolini, his father being Marco di Giacomo Raibolini, a carpenter; he was apprenticed to a goldsmith named Francia, and from him probably he got the nickname whereby he is generally known; he, moreover, studied design under Marco Zoppo. The youth was thus originally a goldsmith, and also an engraver of dies and niellos, and in these arts he became



extremely eminent. He was particularly famed for his dies for medals; he rose to be mint-master at Bologna, and retained that office till the end of his life.

A famous medal of Pope Julius II, as liberator of Bologna, is ascribed to his hand, but not with certainty. At a mature age—having first, it appears, become acquainted with Mantegna—he turned his attention to painting. His earliest known picture is dated 1494 (not 1490, as ordinarily stated). It shows so much mastery that one is compelled to believe that Raibolini must before then have practiced painting for some few years. This work is now in the Bologna gallery,—the Virgin enthroned, with Augustine and five other saints. It is an oil picture, and was originally painted for the church of S. Maria della Misericordia, at the desire of the Bentivoglio family, the rulers of Bologna. The same patrons employed him upon frescos in their own palace; one of Judith and Holophernes is especially noted, recalling Mantegna. The London National Gallery contains two remarkably fine specimens of Francia,—the Virgin and Child and St. Anne enthroned, surrounded by saints, and (in the lunette) the Pietà, or lamentation of angels over the dead Saviour. They come from the Buonvisi chapel in the church of S. Frediano, Lucca. Other leading works are—in Munich, the Virgin sinking on her knees in adoration of the Divine Infant, who is lying in a garden within a rose trellis; in the Borghese Gallery, Rome, a Peter Martyr; in Bologna, the frescos in the church of St. Cecilia, illustrating the life of the saint, all of them from the design of Raibolini, but not all executed by himself; a public passage now traverses these frescos, and they are in a pitiful state of decay. Francia had more than 200 scholars. Marcantonio Raimondi, the famous engraver, is now the most renowned of them; next to him, the painter Lorenzo Costa; also Amico Aspertini, and Francia's own son Giacomo, and his cousin Julio.

FRANCIA, JOSÉ GASPAR RODRIGUEZ, commonly called Dr. Francia, dictator of Paraguay, one of the most remarkable men connected with the history of South America. The date of his birth is not definitely ascertained, but probably falls about 1757. According to one account, he was of French descent; but the truth seems to be that his father, Garcia Rodriguez França was a native of St. Paulo in Brazil, and came to Paraguay to take charge of a plantation of black tobacco for the Government. He studied theology at the college of Cordova de Tucuman, and is said to have been for some time a professor in that faculty; but he afterwards turned his attention to the law, and practised in Asuncion. Having attained a high reputation at once for ability and integrity, he was naturally selected for various important offices, and exercised great personal influence. The Robertsons, whose accounts have done so much to blacken his memory, relate how, when he was requested by one of his friends to undertake an unjust cause in his behalf, he not only refused, but went and offered his services to the man who was likely to be wronged, and by his boldness and energy secured his case. On the declaration of Paraguayan independence in 1811, he was appointed secretary to the national junta, and exercised an influence on affairs greatly out of proportion to his nominal position. When the congress or junta of 1813 changed the constitution and established a duumvirate, Dr. Francia and the Gaucho general Fulgencio were elected to the office. A story is told in connection with their installation, which recalls the self-coronation of William I. of England and Napoleon the great. In theatrical imitation of Roman custom, two curule chairs had been placed in the

assembly, one of them bearing the name of Cæsar and the other that of Pompey. Francis seated himself in the Cæsar chair, and left his colleague to play the part of Pompey as best he might. In 1814 he secured his own election as dictator for three years, and at the end of that period he obtained the dictatorship for life. He was no mere nominal sovereign; but for the next twenty-five years he might have boasted, with even more truth than Louis XIV., “L'état c'est moi.” In the accounts which have been published of his administration we find a strange mixture of capacity and caprice, of far-sighted wisdom and reckless infatuation, strenuous endeavors after a high ideal and flagrant violations of the simplest principles of justice. He put a stop to the foreign commerce of the country, but carefully fostered its internal industries; was disposed to be hospitable to strangers from other lands, and kept them prisoners for years; lived a life of republican simplicity, and punished with Dionysian severity the slightest want of respect.

Deeply imbued with the principles of the French Revolution, he was a stern antagonist of the church. He abolished the Inquisition, suppressed the college of theology, did away with the tithes, and inflicted endless indignities on the priests. “What are they good for?” was his saying; “they make us believe more in the devil than in God.” He discouraged marriage both by precept and example, and left behind him several illegitimate children. For the extravagances of his later years the plea of insanity has been put forward; and it was evident that his worst characteristics were at their worst when the east wind blew. The circumstances of his death were in strange keeping with his life. He was about to sabre his doctor when he was seized with a fit, and he expired the same day, September 20, 1840. He was buried in the cathedral of Asuncion, but the spot is no longer known, and a story is told by Mr. Mansfield and by Lieutenant-Colonel Thompson to the effect that his body was dug up by some private enemies and flung into the river. On the other hand, it is well known that the greatest respect was shown to his memory by those who succeeded him in the government of Paraguay. Unfortunately for the history of his administration, Francia kept no records; and he caused all his orders to be returned to him with the word “executed” on the margin, and then to be destroyed.

FRANCIABIGIO (1482–1525), a Florentine painter. The name of this artist is generally given as Marcantonio Franciabigio; it appears, however, that his only real ascertained name was Francesco di Cristofano, and that he was currently termed Francia Bigio, the two appellatives being distinct. He was born in Florence, and studied under Albertinelli for some months. In 1505 he formed the acquaintance of Andrea del Sarto; and after a while the two painters set up a shop in common in the Piazza del Grano. Franciabigio paid much attention to anatomy and perspective, and to the proportions of his figures, though these are often too squat and puffy in form. He had a large stock of artistic knowledge, and was at first noted for diligence. As years went on, and he received frequent commissions for all sorts of public painting for festive occasions, his diligence merged into something which may rather be called workmanly offhandedness. He was particularly proficient in fresco, and Vasari even says that he surpassed all his contemporaries in this method—a judgment which modern connoisseurship does not accept. In the court of the Servi (or cloister of the Nunziata), in Florence, he painted in 1513 the Marriage of the Virgin, as a portion of a series wherein Andrea del Sarto was



chiefly concerned. The friars having uncovered this work before it was quite finished, Franciabigio was so incensed that, seizing a mason's hammer, he struck at the head of the Virgin, and some other heads; and the fresco, which would otherwise be his masterpiece in that method, remains thus mutilated to the present day. At Lo Scalzo, in another series of frescos on which Andrea was likewise employed, he executed in 1518-19 the Departure of John the Baptist for the Desert, and the Meeting of the Baptist with Jesus; and, at the Medici Palace at Poggio a Caiano, in 1521, the Triumph of Cicero. Various works which have been ascribed to Raphael are now known or reasonably deemed to be by Franciabigio. Such are the Madonna del Pozzo, in the Uffizi Gallery; the half figure of a Young Man, in the Louvre, and the famous picture in the Fuller-Maitland collection, a Young Man with a Letter. These two works show a close analogy in style to another in the Pitti Gallery avowedly by Franciabigio, a Youth at a Window.

FRANCIS I. (1494-1547), king of France, son of Charles of Orleans, count of Angoulême, and Louisa of Savoy, was born at Cognac September 12, 1494. As heir-presumptive of the throne of France, he received special favors from Louis XII., who created him duke of Valois and in 1512 gave him the command of the army of Navarre. In this position, though achieving no important results, he conducted himself with such prudence and courage that in 1513 he was appointed to the command of the army in Picardy, where he successfully carried out the plan of defensive operations that was intrusted to him. He married Claude, daughter of Louis XII., in 1514, and succeeded him on the throne January 1, 1515. After his accession the first and great object that occupied his ambition was the recovery of Milan, the inheritance of which he claimed through his great-grandmother Valentina Visconti. Accordingly, while, in order to render himself secure against external attacks, he negotiated an alliance with Charles of Austria, afterwards the emperor Charles V., and the renewal of a treaty concluded by Louis XII., with Henry VIII. of England, he also began to collect his forces for an Italian expedition. The politic negotiations which won him Genoa, the acquisition of which was all-important as commanding the connection between Milan and the sea, placed the purpose of his preparations beyond all doubt, and caused Leo X. to unite in an alliance against him with the Spaniards and the Swiss. The Swiss at once occupied all the mountain passes; but Francis, guided by a Piedmontese peasant, succeeded, after great labor and difficulty, in leading his army over the Alps by a pass deemed impracticable, and, descending into the friendly territories of the marquis of Saluzzo, surprised and routed, at Villa Franca Colonna, the general of the papal cavalry, and thus outflanking the Swiss caused them to fall back upon Milan. Completely disconcerted by the sudden movement, they at first actually entered into negotiations for a truce; but receiving shortly afterwards a reinforcement of troops and their arrears of pay, they endeavored to surprise the French at Marignano. This battle, begun on the 13th of September, 1515, prolonged into the night, and renewed on the following morning, was fought on both sides with furious and stubborn courage; but on the arrival of Alviano, the Venetian commander, to the succor of Francis, the Swiss retreated unpursued to Milan. Shortly afterwards Milan surrendered, and in November a treaty was concluded between Francis and the Swiss, which subsequently took the form of a perpetual alliance. Such rapid and brilliant success at once gave Francis

a position of commanding influence, and enabled him still further to strengthen himself by additional advantageous treaties. In 1516 he compromised the long dispute with the popes by superseding the Pragmatic Sanction of Bourges by a "Concordat," an act which, while it recognized the superiority of the pope over the councils, and gave him the command of the *annates* and other rich sources of revenue, intrusted the French monarch with the power of nominating to vacant benefices. In 1517 he entered into an alliance with the emperor Maximilian and Charles I. of Spain against the Turks; and in 1518 he made an arrangement with Henry VIII. of England, by which France bought back Tournay.

On the death of Maximilian in 1519, Francis became a candidate for the imperial crown; but chiefly through the recommendation of Frederick the Wise of Saxony, the choice fell on Charles I. of Spain, from that time known as Charles V. War between Charles and Francis could scarcely have been avoided, even if the materials for kindling it had not been already prepared; but inherited disputes in regard to Navarre, Milan, Burgundy and Arles would in any case have sooner or later rendered an appeal to the decision of the sword almost inevitable. With a view to such possibilities, the great aim of both was to secure the alliance of Henry of England and the pope, and here fortune again ultimately smiled on Charles. Francis, elated by his previous achievements on the battlefield, and chagrined at the overthrow of his hopes of obtaining the imperial crown, was naturally eager to strike the first blow; and the request of Henry II. of Navarre to aid him in regaining his kingdom came apportunately to second his wishes. Accordingly, in April, 1521, he sent an army to the aid of Henry. Charles at once retaliated by an invasion of France, and in May concluded a treaty with Pope Leo X. for the expulsion of the French from Italy. Navarre, after being almost won, was again lost by Henry; and in Italy the French, chiefly through the blunders of Lautrec, the brother of the king's mistress, lost Milan, Genoa, and all their conquests, with the exception of the stronghold of Cremona; but the attempt of the imperialists to enter France was pushed back, and Francis, following in pursuit, only by unaccountable negligence, missed the opportunity of inflicting a crushing defeat on Charles between Cambray and Valenciennes. After this, difficulties continued to thicken round the French king; on January 9, 1522, the papal throne was mounted by Adrian VI., who had formerly been tutor to Charles V., and in May, Henry VIII. declared war against France; in August, 1523, a coalition was formed against her which included the pope, the emperor, the king of England, the archduke of Austria, the duke of Milan, and the principal Italian republics; and about the same time Charles Constable Bourbon, having been unjustly used by Louisa of Savoy, withdrew from France, and offered his sword to Charles V. The Spanish troops crossed the French frontiers at Bayonne; the English entered Picardy, and advanced to within eleven leagues of Paris; and after the repulse of the French army dispatched against Milan, the imperialists passed over into Provence and laid siege to Marseilles. Through cautious but stubbornly defensive tactics, however, both the Spanish and English incursions were foiled, and Francis was thus able to advance to the relief of Marseilles with a large army. The imperialists did not wait his approach; but, determined on retaliation, he crossed the Alps and laid siege to Pavia, where a strong Italian force had taken refuge. Here he was attacked February 24, 1525, by a relieving army under Bourbon and Pescara. His army was speedily either cut down or dispersed in flight, and he himself,



after a desperate attempt to rally, was made prisoner and conveyed by Charles to Madrid. He only regained his liberty, February 21, 1526, by signing a treaty whereby he ceded to Charles both Burgundy and Milan. Its stipulations were guaranteed by the retention of his two sons in the emperor's hands; but he nevertheless resolved to disregard it, and in this he was supported by Pope Clement VII. and also by Henry of England, whom jealousy and alarm at the emperor's success had induced to change sides. Though formal war was not declared, a French army was dispatched to Italy, but the supineness with which the campaign was prosecuted enabled the imperialists to have it all their own way; and an army of mercenaries under Bourbon, who perished in the assault, marching unopposed to Rome, captured and sacked the city, and took the pope prisoner. On this Francis and Henry at once declared war against the emperor; but the army sent into Italy under Lautrec almost melted away before the walls of Naples; and Genoa, by suddenly declaring for the emperor, completed the ruin of the French cause in Italy. The pope soon thereafter saw it to be his interest to be reconciled with Charles; and in August, 1529, Charles and Francis agreed to the treaty of Cambray, by which Francis retained Burgundy and obtained by a ransom the release of the French princes, but renounced his claims in Italy and ceded Artois and Flanders to his rival. He also agreed to fulfill the promise entered into at Madrid to marry Eleanor of Portugal, sister of Charles, his first wife having died in 1524. During the years of peace that followed this treaty, Francis, though he had encouraged the Smalkald League in Germany, persecuted with great vigor the adherents of Protestantism in his own kingdom; but when war was again declared, he issued an edict of toleration. The pretext for the renewal of the war was the murder of the French ambassador by Duke Sforza of Milan in 1533, but hostilities were delayed till 1535, when, emboldened by the weakened condition of the emperor after his war against the Turks, Francis overran Savoy and took possession of Turin. His advantages were, however, followed up with so little energy that Charles, after driving the French out of Italy, began an invasion of Provence; and his progress was only checked by the barbarous destruction of the country before him by Anne of Montmorency. Meantime Francis attacked Flanders, and entered into an alliance with Sultan Soliman II., whose invasion of Hungary induced Charles in 1538 to consent to the ten years' truce of Nice. In 1540 Charles, while the guest of the French monarch, held out to him the hope of a complete satisfaction of his wishes through the investiture of the duke of Orleans with the duchy of Milan; but the promise, if definitely made, was never fulfilled, and Francis, finding a favorable opportunity after the disastrous issue of the emperor's expedition against Algiers, renewed on a flimsy pretext the war in 1542. An offensive alliance was formed with the Turks, the duke of Cleves, and Denmark and Sweden; separate armies attacked at various points the Spanish, Flemish, and Italian frontiers; and the united French and Turkish forces captured and burned Nice. The monotony of the indecisive conflict was relieved in April, 1544, by a brilliant French victory at Ceresole, but the success came too late to permit of its being followed up by an advance into Italy; for in the July following, the emperor from Champagne and the king of England from Picardy were marching to join forces before the walls of Paris. The siege of Boulogne by the English gave Francis, however, sufficient time to make a show of defense such as convinced Charles of the doubtful nature of the enterprise; and without consulting the king of England he sent to

Francis from Crespy terms of peace, which were signed September 17th. By this treaty France retained Burgundy and resigned its claims on Flanders, Artois, and Naples, while the duchy of Milan was promised to the duke of Orleans on his marrying one of the imperial princesses — an arrangement, however, which his death in 1545 rendered nugatory. For some time afterward the English king continued the war in Picardy, but a treaty of peace was signed in June, 1546. As soon as peace was concluded with the emperor, the persecution of the Protestants in France was renewed, and in 1545 an edict was passed for the expulsion of the Waldenses from Provence. The health of Francis had for several years been completely undermined, and he succumbed to an acute attack of disease, May 31, 1547.

FRANCIS II. (1543-1560), king of France, eldest son of Henry II. and of Catherine de' Medici, was born at Fontainebleau, January 19, 1543. He married the famous Mary Stuart, daughter of James V. of Scotland, April 25, 1558, and ascended the French throne July 10, 1559. He died in 1560.

FRANCIS I., head of the Holy Roman Empire, the eldest son of Leopold, duke of Lorraine, was born on December 8, 1708. His full name was Francis Stephen. At the age of fifteen he was sent to Vienna, where he received the Silesian duchy of Teschen. In 1735, in return for Lorraine, which Charles VI., at the end of the war of the Polish succession, gave to Stanislaus Leszczynski, Francis Stephen obtained the reversion to the duchy of Tuscany, to which he succeeded in 1737. He was elected emperor after the death of Charles VII., and crowned at Frankfort on October 4, 1745. He suddenly died at Innsbruck on August 18, 1765, falling into the arms of his second son Leopold, who succeeded him as duke of Tuscany, and ultimately (after the death of Joseph II.) became emperor.

FRANCIS II., the last Holy Roman Emperor, and, as Francis I., first emperor of Austria, was born in Florence on February 12, 1768. He was the son of the emperor Leopold II., after whose death, in 1792, he succeeded to the hereditary dominions of the house of Austria, being crowned emperor in the same year. He was immediately involved in the first of his famous wars with France, in which, till 1795, he had the support of the king of Prussia. He was compelled, mainly in consequence of the victories of Napoleon, who pressed northward from Italy into Carinthia, to conclude, on October 17, 1797, the treaty of Campo Formio, whereby the empire lost the greater part of the left bank of the Rhine, and Austria had to give up the Netherlands and Lombardy. Austria received in return Venetia, Friuli, Istria and Dalmatia. In 1799 war broke out afresh, the emperor having on this occasion England and Russia as allies. During the first campaign the French were everywhere defeated; but in the following year Napoleon gained the brilliant victory of Marengo, while Moreau was equally successful at Hohenlinden. The shock of these two battles made it impossible for Austria to continue the war, and on February 9, 1801, she concluded the treaty of Lunéville, which confirmed that of Campo Formio, besides exacting fresh sacrifices. France now obtained the whole of the left bank of the Rhine. Once more in association with Russia and England, the emperor began another war with France in 1805. The capitulation of Ulm and the battle of Austerlitz, great as were these disasters, did not make the case of Austria hopeless, for she still had large forces; Russia was willing to continue the war, and the power of France had been seriously crippled at Trafalgar. But Francis was dispirited, and craved peace. On December 25, 1805, was concluded the treaty of Presburg, which deprived Austria of Venetia and Tyrol.



In 1806, after the formation of the Confederation of the Rhine, he formally resigned the imperial crown, thus bringing to an end the Holy Roman Empire and the kingdom of Germany. Forgetting the true meaning of the word emperor, he had in 1804 proclaimed himself, as Francis I., hereditary emperor of Austria; and this title has been retained by his successors. He took no part in the war of Prussia with France in 1806, but after some time began to make preparations for a determined struggle, by which he should regain all the advantages lost in previous wars. The new conflict broke out in 1809, and the whole of Germany awaited the result with intense anxiety. Austria was unfortunate at first; but the highest hopes were excited by her thorough victory of Aspern. It was followed by the battle of Wagram, which enabled Napoleon to dictate peace from the palace of Schönbrunn, where he had once before taken up his quarters. By the treaty of Schönbrunn (October 14, 1809,) he transferred the allegiance of about 4,000,000 of Austrian subjects to other rulers; but as in the following year he married Maria Louisa, the eldest daughter of Francis, it seemed probable that the two sovereigns would in future be on friendly terms. Francis was the ally of Napoleon in his war with Russia in 1812; and when, after the retreat from Moscow, France found herself confronted by Russia and Prussia, Austria at first remained neutral, and in the summer of 1813 acted as mediator. In August of the same year she joined the allies; and, like the sovereigns of Prussia and Russia, Francis accompanied his troops in the war which followed. The settlement of Europe which resulted from the final defeat of Napoleon made Francis a more powerful sovereign than he had been at the beginning of his reign; and from this time forward he lived at peace, except that he had to put down a rising in Lombardy in 1821. Francis was married four times, having by his second wife, Maria Theresa, princess of Sicily, thirteen children. He died March 2, 1835, and was succeeded by his son Ferdinand.

FRANCIS, ST., a well-known saint of the Roman Catholic Church, the founder of the great order of Franciscans, was born at Assisi in the year 1182. Francis found his vocation, not only in a life of entire devotion and poverty for himself, but in founding an order of mendicants devoted to the service of the church. This was about the year 1208 or 1209, when, therefore, the saint was about twenty-six years of age. He was henceforth a preacher as well as an exemplar of poverty. He essayed to reproduce the picture of the divine life on earth, having not where to lay his head, going about doing good, and preaching the gospel of the kingdom. Gradually there gathered round his cell, which he had fixed outside the town, near a little church, the St. Maria degli Angeli, better known as the Portiuncula, a band of disciples as enthusiastic as himself.

In this insignificant manner was laid the foundation of the Franciscan order. At first there were only seven, himself the eighth, but all were animated by the same spirit, and all followed the same rule of life.

Francis founded an order of poor sisters as well as poor brothers, known by the name of Poor Claras or Clarisses. The origin of the sisterhood is encircled in a halo of romance, such as everywhere surrounds the footsteps of St. Francis. Clara was a young lady of the neighborhood, who, either attracted by the saint's preaching, or enamored of his life of poverty, or both, resolved to devote herself to self-sacrifice, as he and his companions had done. He is said to have "poured into her ears the sweetness of Christ." The result was that she forsook her home, fled to the Portiuncula, and, being first a member of the order, was then placed in a

female convent. From this questionable beginning sprang the sisterhood nearly as famous in its history as the great brotherhood, and which survives till this day. There was a third order also sprung up in the course of the saint's lifetime. So marvelous were the consequences of his preaching that whole populations, it is said, wished to devote themselves to consecrated poverty. But many, of course, had no real vocation to such a service, and Francis, visionary as he was, saw that the excesses of his system might prove its ruin. So he arranged to receive persons of this class into an order of what was called Tertiaries or Brethren of Penitence, who retained their social position and their customary employments in the world, while coming under general vows to abstain from worldly dissipations, such as the theater, and otherwise to be scrupulous in all their conduct. Women were not admitted to this order without the consent of their husbands. Its members did not wear silk or other costly materials, but they had no special costume, and otherwise were at liberty. His conduct in this matter is sufficient to prove that, amidst all the apparently childlike enthusiasm of the saint, he possessed, as indeed cannot be doubted, no inconsiderable vein of shrewd discernment and of practical ability. This order was established in 1221. St. Francis, worn out by his many labors and consuming zeal, died October 4, 1226.

FRANCIS BORGIA, ST. (1510-1572), duke of Gandia, and afterward general of the Jesuit order, was the son of John, duke of Gandia, a scion of the well-known family of Borgia, or Borja, to which Popes Calixtus III. and Alexander VI. had belonged, and of Joanna of Aragon, daughter of Alphonso, a natural son of Ferdinand the Catholic. He was born at Gandia (Valencia). His death took place at Rome. He was beatified by Urban VIII. in 1624, and canonized by Clement X. in 1671, his festival being afterward (1683) fixed by Innocent XI. for October 10th.

FRANCIS, ST., OF PAOLA (1416-1507), founder of the order of Minims, was born of humble parentage at Paola in Calabria. His education appears to have made very little progress until he reached his thirteenth year, when, in accordance with a vow, he was taken by his father to the Franciscan convent of San Marco in Calabria. Here he learned to read, and distinguished himself by his austerities; but at the close of a probationary year he, for some reason that is not mentioned, left San Marco, and, after a pilgrimage to Assisi and Rome, retired to the neighborhood of his native town, where in a cave by the sea-shore he gave himself wholly to a hermit life, after the example of the great St. Francis, having no bed but the bare rock, and no other food than the herbs which he gathered in the neighboring wood, or which were sometimes brought to him by his friends. In the course of time he was joined by some others like-minded with himself, and the building of a chapel in 1436 is generally considered as marking the first beginning of the Minimite order. The death of Francis took place in his ninety-first year at Plessis. He was canonized by Leo X. in 1519 — his day in the calendar being April 2d (Duplex).

FRANCIS, ST., OF SALES (1567-1622), bishop of Geneva, and a well-known devotional writer of the Roman Catholic Church, was born at the Chateau de Sales, near Annecy in Savoy. In 1598 Francis was appointed coadjutor bishop of Geneva, and became the official companion, as he had long been the warm friend, of Claude de Garnier, the aged bishop who had fostered his talents and largely shaped his career. Some years after this, in 1602, he spent some time in France and especially in Paris, where his preaching attracted great crowds, and his influence was felt from the court



of Henry IV. to the poor sisters at Port Royal. In 1608 Francis published his best known and most valuable work, the *Introduction à la Vie Dévote*, the circulation of which was immense. Both as a preacher and as a writer a certain overweening "sweetness" may be said to be his marked characteristic—a sweetness at times not without duplicity and a taint of cold-blooded fanaticism. He died in the end of 1622, and was canonized in 1665.

FRANCIS, SIR PHILIP, a conspicuous Whig politician, and, even apart from his supposed connection with the *Letters of Junius*, a powerful pamphleteer, was born in Dublin, in 1740. In 1761 he became personally known to Pitt, who, recognizing his ability and discretion, once and again made use of his services as private amanuensis. In 1762 he was appointed to a principal clerkship in the war office, and in the same year he married Miss Macrabie, the daughter of a retired London merchant. He is known to have written for the *Public Ledger* and *Public Advertiser*, as an advocate of the popular cause on many occasions about and after the year 1763; he frequently attended debates in both Houses of Parliament, especially when American questions were being discussed; and between 1769 and 1771 he is also known to have been favorable to the scheme in which Calcraft and others were engaged for the overturn of the Grafton government and afterward of that of Lord North, and for persuading or forcing Lord Chatham into power. In January, 1769, the first of the *Letters of Junius* appeared, and the series was continued till January 21, 1772. They had been preceded by others under various signatures, which, however, are all attributed to one and the same hand.

In January, 1772, the office of deputy secretary in the war office became vacant, and the post was offered by Lord Barrington to Francis, who declined it. In July of the same year he left England for a tour through France, Germany and Italy, which lasted until the following December. On his return he was, according to an autobiographical fragment which has been preserved, contemplating emigration to New England, when, in June, 1773, Lord North, on the recommendation of Lord Barrington, appointed him a member of the newly constituted supreme council of Bengal, at a salary of £10,000 per annum. He returned to England in October, 1781. In the general election of April, 1784, Francis was returned by the borough of Yarmouth, Isle of Wight. On this occasion he took an opportunity to disclaim every feeling of personal animosity toward Hastings. This did not prevent him, however, on the return of the latter, in 1786, from doing all in his power to bring forward and support the charges which ultimately led to the impeachment resolutions of 1787. The acquittal of Hastings in April, 1795, disappointed Francis of the governor-generalship, and in 1798 he had to submit to the additional mortification of a defeat in the general election. He was once more successful, however, in 1802, when he sat for Appleby. Though re-elected for Appleby in 1806, he failed to secure a seat in the following year; and the remainder of his life was spent in comparative privacy. In 1814 he married his second wife, Miss Emma Watkins, who long survived him, and who has left voluminous manuscripts relating to his biography. He died on December 23, 1818.

FRANCISCANS. The Franciscan orders include the three orders of the Minorites, and all the less important associations who trace their rule to Francis of Assisi. The three orders of the Minorites, or Franciscans proper, include (1) the Minorite friars, properly so-called, under a succession of generals of the whole order from the foundation; (2) the order of the Poor Ladies

or Poor Clares—the Franciscan nuns; (3) the order of Penitent Men and Women, which includes (a) all those who dwell in Franciscan cloisters and keep the third rule, (b) those who live in cloisters of their own, keeping the third rule, and (c) the Tertiaries properly so called. All these three orders of Friars, Nuns and Tertiaries are more or less under the jurisdiction of the general minister of the Franciscan order.

The rule originally prescribed by St. Francis was very strict, and, rigidly enforced, would have made all the members of the order pious beggars. This was the founder's idea, but when the order became popular it was found that few of its members could act up to its requirements; and even in the lifetime of the founder attempts were made to relax them. The relaxations sanctioned by the decrees of popes and by general usage were repeatedly fought against by small but zealous minorities, and these struggles gave rise to various divisions in the order. Since the time of Leo X. and his union bull these divisions have been reduced to three—the Observants, the Conventuals and the Capuchins—all of whom belong to the first order of the Franciscans; and they are the survivals of a much more numerous division. The Observants are supposed to keep the rule of Francis with some strictness, and they take the first rank among the Franciscans; their minister general has pre-eminence. The Conventuals follow the rule of Francis with certain relaxations permitted by successive popes. Their general has to be confirmed by the great minister general, but otherwise they are independent. Since 1528 the Capuchins have had an independent general under the minister general.

The Franciscan soon became one of the most important of the mediæval monastic orders. It had a peculiar character, and attracted minds of the sympathetic mystical cast. This led to its curious connection with many of the mediæval heretical sects. The Franciscan theology was also peculiar. It had the same Pelagian characteristics that distinguish the modern Jesuit theology, which has done little more than develop the Franciscan ideas on the immaculate conception, the doctrines of freedom and grace, etc. During the Middle Ages the Franciscans, however, furnished many strong opponents to the papal theology and ecclesiastical claims. The order has produced a long array of distinguished theologians and churchmen—Bonaventura, Alexander Hales, John Duns Scotus, and William of Occam were all Franciscans. Wadding, the great historian of the Franciscans, has filled a folio volume with names of distinguished members of the order.

FRANCISQUE. Jean François Millet (c. 1644–1680), commonly called Francisque, was born at Antwerp, and is generally classed among the painters of Flanders, on account of the accident of his birth. He was received a member of the Academy of Painting at Paris, in 1673, and, after gaining consideration as an imitator of the Poussins, he died in 1680, bequeathing his art and some of his talents to one of his sons.

JEAN FRANÇOIS MILLET, the younger, was born in Paris, and was made a member of the Academy of Painting at Paris in 1709. He died in 1773.

FRANCK. The name of Franck has been given indiscriminately but improperly to painters of the school of Antwerp, who belong to the families of Francken and Vranex (see FRANCKEN and VRANEX). One artist, truly entitled to be called Franck, is Gabriel, who entered the guild of Antwerp in 1605, became its president in 1636, and died in 1639. Gabriel Franck taught a great number of pupils, among whom we notice Abraham Genoels the elder, and Laurent Franck, the master of Francisque. None of his works are now to be traced.

FRANCK or FRANK. SEBASTIAN (c. 1500–1543),



not unfrequently called by the Latinized form of his name, *Francus*, an important German writer of the Reformation period, was born at Donauworth.

FRANCKE, AUGUST HERMANN, an influential German philanthropist and theologian, was born 1663 at Lübeck. He graduated at Leipsic in 1685, but, having found employment as a "privat-docent," did not quit the university until the end of 1687. He next passed a number of months at Lüneburg as assistant or curate to the learned and pious superintendent Sandhagen, and there his religious life was remarkably quickened and deepened. On leaving Lüneburg, he spent some time in Hamburg, where he was engaged as a teacher in a private school, and there also he considered himself to have acquired some experience which proved invaluable in after life. After a long visit to Spener, who was at that time in Dresden, and who encouraged him in the plans he had formed, he returned to Leipsic in the spring of 1689, and began to give Bible lectures of an exegetical and practical kind, at the same time resuming the collegia philobiblica of earlier days. He rapidly became very popular as a lecturer; but the peculiarities of his teaching almost immediately aroused a violent opposition on the part of the university authorities; and, before the end of the year, he was, on the ground of his alleged pietism, interdicted from lecturing. Thus it was that Francke's name first came to be publicly associated with that of Spener, and with one of the most fruitful church movements of the seventeenth century. Prohibited from lecturing in Leipsic, Francke, in 1669, found work at Erfurt as "deacon" of one of the city churches. Here his evangelistic fervor attracted multitudes to his preaching, but at the same time excited the jealousy of his less zealous colleagues as well as the antipathy of the Catholic section of the population; and the result of their combined opposition was that, after a ministry of fifteen months, he was, in September, 1691, banished from the town by the civil authorities. The same year witnessed the expulsion of Spener from Dresden. In December, Francke received and accepted an invitation to fill the chair of Greek and Oriental languages in the new university of Halle, which was at that time being organized by the elector Frederick III. of Brandenburg; and at the same time, the chair having no salary attached to it, he was appointed minister of the parish of Glaucha, in the immediate neighborhood of the town. Here, for the next thirty-six years, he continued to discharge the two-fold office of pastor and professor with rare energy and success. He died at Halle on June 8, 1727.

FRANCKEN. Eleven painters of this family cultivated their art in Antwerp during the sixteenth and seventeenth centuries. Several of these were related to each other, while many bore the same Christian name in succession. Hence unavoidable confusion in the subsequent classification of paintings not widely different in style or execution. When Franz Francken the first found a rival in Franz Francken the second, he described himself as the "elder," in contradistinction to his son, who signed himself the "younger." But when Franz the second was threatened with competition from Franz the third, he took the name of "the elder," while Franz the third adopted that of Franz "the younger." It is possible, though not by any means easy, to sift the works of these artists.

FRANÇOIS DE NEUFCHÂTEAU, NICOLAS LOUIS, COUNT (1750-1828), a French statesman and poet, was born at Saffais, in the district of Meurthe. He had very multifarious accomplishments, and interested himself in a great variety of subjects, but his fame rests chiefly on what he did as a statesman for the encouragement and development of the industries of

France. His maturer poetical productions did not fulfill the promise of those of his early years, for though some of his verses have a superficial elegance, his poetry generally lacks force and originality. He had considerable qualifications as a grammarian and critic, as is witnessed by his editions of the *Provinciales* and *Pensées* of Pascal, Paris, 1822 and 1826, and *Gil Blas*, Paris, 1820. He is also the author of a large number of works on agriculture.

FRANCONIA, in German, FRANKEN, a name of very different application in different historical periods. It properly signifies the land of the Franks, and is, consequently, identical in original meaning with the word Francia, or France. In the beginning of the fourth century the Frankish territory stretched from the Loire eastward to the basin of the Rhine and the Main; but it was shortly afterward broken up into two divisions — Austrasia, Francia Orientalis, or the kingdom of the East Franks, and Neustria, Francia Occidentalis, or the kingdom of the West Franks. As time went on both kingdoms extended their boundaries; and when the treaty of Verdun, in 845, settled the claims of the grandsons of Charles the Great, there was a kingdom of Western France with Latin tendencies, and a kingdom of Eastern France with Teutonic tendencies, each possessing a central district or duchy of its own name. These districts were separated from each other by the district of Lotharingia or Lorraine. The western was soon after lost sight of; but the eastern continued for a long period to be the very core and kernel of the German kingdom, and a theory became prevalent that it was the original seat of the Franks in Germany. Under the Saxon and Franconian emperors it was subdivided into Ost-Franken, Francia Orientalis, or Eastern Franconia *par excellence*, and Rhein-Franken, Francia Rhenensis, or Rhenish Franconia. The former, which was also distinguished as Saal-Franken, stretched from the Fichtelgebirge and the Rhone to the Danube, and from the Upper Palatinate to the Spessart and the lands of the Neckar; while the latter was the country between the Spessart and the Rhine, and included the present district of Frankfort-on-the-Main. Though the name frequently occurs in our histories, there was probably no proper "duchy" of Franconia, in the same sense at least as there was a duchy of Saxony or a duchy of Bavaria. Both Eastern Franconia and Rhenish Franconia were broken up into a number of distinct territories — countships, lordships, etc. When Maximilian divided Germany into circles, in 1501, he gave the name of Franconia to the circle which included the bishoprics of Würzburg, Bamberg, and Eichstädt, the district of Mergentheim belonging to the grand master of the Teutonic Order, the territory of the abbey of Schönthal, the principalities of Baireuth and Ansbach, the countships of Henneberg and Schwarzenberg, the territories of the curia of Franconian counts, the imperial towns of Nuremberg, Rothenburg, Schweinfurt, Weissenburg, and Windsheim. Altogether the circle comprised sixty-nine territories, and had an area of about 10,430 square miles, and in 1790 its population amounted to 1,547,000. The name of Franconia ceased to be officially used after the dissolution of the German empire, in 1806; but in 1837 King Louis I. of Bavaria gave the names of Upper, Middle, and Lower Franconia to what had previously been known as the circles of the Upper Main, the Rezat, and the Lower Main. Upper Franconia forms the northeast portion of Bavaria, and is partly conterminous with the frontiers of Bohemia, Saxony and Prussia.

FRANEKER, a town of Holland, province of Friesland, is situated ten miles west of Leeuwarden, on the canal between that town and Haarlingen.

FRANKENBERG, an important manufacturing



town of Saxony, circle of Zwickau, is situated on the Zschopau, seven miles northeast of Chemnitz.

FRANKENHAUSEN, a town of Germany, principality of Schwartzburg-Rudolstadt, is situated on the Little Wipper, thirty-six miles north-northeast of Gotha. Population (1890), 5,000.

FRANKENSTEIN, a town in the Prussian province of Silesia, government of Breslau, is situated thirty-five miles south by west of the town of that name.

FRANKENTHAL, a town in the Rhenish district of Bavaria, is situated on the Isenach, nine miles northwest of Mannheim, and is connected with the Rhine by a canal four miles in length. Population, 8,000.

FRANKFORT, a city of the United States, capital of Franklin county and of the State of Kentucky, is picturesquely situated on both sides of the Kentucky river, on a space of elevated ground bounded by a bluff 150 feet high. It is distant twenty-nine miles west-northwest from Lexington, and sixty-five miles east from Louisville, by rail. The river is crossed at Frankfort by two bridges, and that portion of the town lying on the south side of the river is known as South Frankfort. The principal buildings are the State house, a marble building with a handsome portico supported by Ionic columns, the institution for imbecile children, the State penitentiary, the county court house, and the public hall. The beautiful cemetery contains the remains of Daniel Boone, the pioneer of Kentucky, who died September 20, 1820. Frankfort has distilleries and flour and cotton mills, and a considerable trade in lumber. The river is navigable for steamers forty miles above the city. Frankfort was laid out in 1787, and became the capital of the State in 1792. Population, 1890, 8,500.

FRANKFORT, a city of central Indiana, the county-seat of Clinton county, is on three railway lines, and is surrounded by a fine farming country. The city contains a court-house, six churches, high and graded schools, two national banks, three elevators, furniture factories, planing mills, etc. Natural gas is utilized for fuel and manufacturing purposes. One daily, one semi-weekly, and three weekly papers are published. Frankfort is a considerable shipping point, and had a population in 1890 of 5,918.

FRANKFORT-ON-THE-MAIN; German, FRANKFURT or FRANKFURTH-AM-MAIN, one of the principal cities of the German empire, in the circle of Wiesbaden, in the Prussian province of Hesse-Nassau, and till 1866 one of the four free cities of Germany. The position which it occupies is one of no small natural beauty in the broad and fertile valley of the Main, its northern horizon being formed by the soft outlines of the Taunus range. The surrounding country is richly clad with orchard and forest, and in the season of spring especially presents a prospect of indescribable luxuriance.

The principal ecclesiastical building in Frankfort is the cathedral of St. Bartholomew's, which is situated not far from the river between the Domplatz on the north and the Weekmarkt on the south. Of the secular buildings in Frankfort perhaps the most characteristic is the Rathhaus or Römer, which, by a strange coincidence, bears a name suggestive of, though not derived from, its principal historical associations. It was here, in the Wahlzimmer or election room, that the electors or their plenipotentiaries decided the choice of the emperors.

Frankfort has always been much more of a commercial than an industrial town, and at present it manufactures little else but Frankfort black, waxcloth, jewelry, gold and silver thread, tapestry and such like articles. The city has long been famous as one of the principal banking centers of Europe; and throughout the city there are upward of 220 banking offices. The

so-called "Frankfort Bank" was founded in 1854, with a capital of 10,000,000 gulden.

Frankfort has been the birthplace of not a few of the most celebrated men of Germany. J. G. Schlosser the historian, Feuerbach the philosopher, Kirchner the scholar and naturalist, Clement Brentano, Bettina von Arnim, and Ludwig Börne, are all in the list; but what the city considers its highest literary distinction is the fact that Johann Wolfgang Goethe was born in 1749 at No. 23 Hirschgraben.

Of memorial monuments the largest and most elaborate in Frankfort is that erected in 1858 in honor of the early German printers. It was modeled by Ed. von der Lausitz and executed by Herr von Kreis.

The present municipal constitution of the town dates from 1867, and conforms to the Prussian system. Including the suburban villages (Bornheim 10,085, Bockenheim 13,043, Oberrad 4,609, and Rödelheim 3,903), the total population is 154,504.

FRANKFORT-ON-THE-ODER; German, FRANKFURT-AN-DER-ODER, a town of Germany at the head of a government in the Prussian province of Brandenburg, about fifty miles in an easterly direction from Berlin. The university of Frankfort, which was founded in 1506 by the elector of Brandenburg, Joachim I., was removed to Breslau in 1811. The population, which in 1849 was 29,969, had at the census of 1889 attained to 62,000.

FRANKINCENSE, or OLIBANUM, a gum-resin obtained from certain species of trees of the genus *Boswellia*, and natural order *Burseraceæ*. From the frequent employment of frankincense in the sacrifices of the ancients, shown by numerous passages in their prose and poetic writings, it is evident that the trade in that substance must formerly have been very extensive. Frankincense, or olibanum, occurs in commerce in semi-opaque, round, ovate, or oblong tears or irregular lumps, which are covered externally with a white dust, the result of their friction against one another. Its fumes are an excellent insectifuge. As a medicine it was in former times in high repute. Pliny mentions it as an antidote to hemlock. Avicenna recommends it for tumors, ulcers of the head and ears, affections of the breast, vomiting, dysentery, and fevers. Dr. Delioux, of Toulon, considers its curative properties equal to those of other balsamic medicines, and that for cheapness it is preferable for hospital use to the balsams of Peru and Tolu, and, being more agreeable to the stomach, to tar. As a fumigating agent, he advocates its employment in bronchitis and chronic laryngitis. In the East frankincense has been found efficacious as an external application in carbuncles, blind boils, and gangrenous sores, and as an internal agent it is given in gonorrhœa. In China it was an old internal remedy for leprosy and struma, and is accredited with stimulant, tonic, sedative, astringent, and vulnerary properties. Its stimulant action appears to be directed chiefly to the mucous surfaces of the body.

Common Frankincense, or Thus, is the term applied to a resin which exudes from fissures in the bark of the Norway spruce fir; when melted in hot water and strained it constitutes "Burgundy pitch." The concremented turpentine obtained in the United States by making incisions in the trunk of a species of pine, *Pinus australis*, is also so designated. It is commercially known as "scrape," and is similar to the French "galipot" or "barras." Common frankincense is an ingredient in some ointments and plasters, and on account of its pleasant odor when burned, has been used in incense as a substitute for olibanum. The "black frankincense oil" of the Turks is stated by Hanbury to be liquid storax.



FRANKLIN. See FREEHOLD.

FRANKLIN, the county seat of Venango county, Pennsylvania, is situated at the junction of French creek and the Allegheny river, on four lines of railway. The river is navigable here at high-water. The manufactories of the city number thirteen, among which are foundries and machine shops, four oil refineries and two flour mills, the latter run by water power from French creek. Franklin contains eleven churches, high and graded schools valued at \$50,000, and a city hall costing \$30,000. There are five banks, and one daily and two weekly newspapers. Population (1890 census), 6,200. The city is lighted with gas, has a good sewerage system, and water-works supplying pure spring water. Fire and police departments are maintained. The city receipts from May 1, 1889, to May 1, 1890, were \$24,282.52.

FRANKLIN, BENJAMIN. There are those who, with a full understanding of his remarkable career, regard Benjamin Franklin as the greatest American. He was the embodiment of the genius of common sense. He is the darling of American biography. He was journalist, author, diplomatist, statesman, financier and philosopher, and is he who, at the age of 43, when the dreams and enthusiasms of youth were gone, conceived the idea, perhaps the most sublime that has entered into the heart of man, of drawing the lightning from the heavens. He alone at the moment knew that lightning and electricity were identical, or understood how the fact might be demonstrated by simple and childish means; but should all other services be forgotten, and the details of a splendid career pass into oblivion, by this will he be remembered. The June afternoon in 1749, the passing showers, the kite, the string and the key. The manifest foolishness of the act would have excited ridicule, and he went alone.

He had no idea of pecuniary profit to accrue. He wrote of his discoveries to a friend in London. The Royal Society ridiculed them, only to afterwards apologize and acknowledge when all others had done so. All his long life he was engaged in a ceaseless but unruffled search for the reason why. There was no subject that did not attract his attention. He invented the musical glasses. He made a successful stove. He made a table of the conductivity of heat in metals. He studied the Gulf-Stream. As an author he wrote everything but poetry, and as a philosopher he studied everything but theology. A tallow-chandler's son, a working printer, an apprentice who was whipped by his elder brother even after he was competent to edit that brother's newspaper, a toiler and wage-earner from early youth, he yet stood among princes, was the ablest diplomatist America ever produced, and ere he died the best known, the most highly-honored, and the best-beloved old man in the old world and the new. With these facts in view the details of his career, given meagerly here of necessity, may be more appreciatively examined.

He was born in the city of Boston, and in the colony of Massachusetts Bay, on January 17, 1706. In his eighth year Benjamin, who never could remember when he did not know how to read, was placed at school, his parents intending him for the church. In his tenth year he was taken from school to assist his father, in the business of tallow-chandler and soap-boiler. In his twelfth year he was apprenticed to his elder brother James, in the printing business. In 1720-21 James Franklin also started a newspaper, the second that was published in America, called *The New England Courant*. The relations of the two brothers, however, gradually grew so inharmonious

that Benjamin determined to quit his brother's employment and leave New England. He sold some of his books and with the proceeds, in October, 1723, he found his way to the city of Philadelphia, where, 400 miles from home, at the immature age of seventeen, without an acquaintance, and with only a few pence in his pocket, he was fortunate enough to get employment. Keith, the governor of the province, took him under his patronage, and proposed to start him in business for himself, and to give him the means of going to England and purchasing the material necessary to equip a new printing office. Franklin embraced the governor's proposal, and took passage for London, but on his arrival there found that he had been made a dupe of by Keith. He readily found employment and continued to work until July 23, 1726, when he again set sail for Philadelphia in company with a Mr. Dunham, who offered him employment in a mercantile house. Only a few months after Franklin's return to Philadelphia, the death of Mr. Dunham put an end to his career as a merchant. While awaiting something more favorable, he was induced by large wages to return to his old employer Keimer. This led to his making the acquaintance of a bright young man named Meredith. He was learning the printer's art, and offered to furnish the capital to establish a new printing office—his father being a man of some means—if Franklin would join him and direct the business. This proposal was accepted, the types were sent for, a house was rented at £20 a year, part of which was sublet to a glazier who was to board them, and before the expiration of a year from his return to Philadelphia, Franklin, for the first time in his life, was in business for himself.

Almost simultaneously, in September, 1729, he bought for a nominal price the *Pennsylvania Gazette*, a newspaper which Keimer had started nine months before to defeat a similar project of Franklin's which accidentally came to his knowledge. It had only ninety subscribers. Franklin's superior journalism, his new type, some spirited remarks on a controversy then waging between the Massachusetts assembly and Governor Burnet (a son of the celebrated Bishop Gilbert Burnet) brought his paper into immediate notice, and his success, both as a printer and as a journalist, was from that time forth assured and complete. During the next seventeen years, he was at the head of journalism in America. In 1731 he established the first circulating library on the continent; in 1732 he published the first of the *Poor Richard's Almanacs*, a publication which was continued for twenty-five years, and attained a marvelous popularity. The annual sale was about 10,000 copies, at that time far in excess of any other publication in the colonies, and equivalent to a sale at the present time of not less than 300,000. In the next ten years he acquired a convenient familiarity with the French, Italian, Spanish and Latin languages.

In 1736 Franklin was chosen a clerk of the general assembly, and was reelected the following year. He was then elected a member of the assembly, to which dignity he was reelected for ten successive years, and was appointed one of the commissioners to treat with the Indians at Carlisle. In 1737 Colonel Spotswood, then postmaster-general, appointed him deputy postmaster at Philadelphia. About this time he organized the first police force and fire company in the colonies, and a few years later initiated the movements which resulted in the foundation of the university of Pennsylvania and of the American Philosophical Society, in the organization of a militia force, in the paving of the streets, and in the foundation of a hospital. It was



during this period, and in the midst of these very miscellaneous avocations, that he made the discoveries in electricity which have secured him undisputed rank among the most eminent of natural philosophers. He was the first to demonstrate that lightning and electricity are one. The Royal Society, when an account of his experiments, which had been transmitted to a scientific friend in England, was laid before it, made sport of them, and refused to print them. Through the recommendation of his friend they were printed, however, in an extra number of the *Gentleman's Magazine*, of which the publisher ultimately sold five editions. A copy chancing to fall into the hands of Buffon, he saw their value, and advised their translation and publication in France, where they immediately attracted attention. The "Philadelphia experiments," as they were called, were performed in the presence of the royal family in Paris, and became the sensation of the period. The Royal Society of London found it necessary to reconsider its action, published a summary of the experiment in its *Transactions*, and, as Franklin afterward averred, more than made him amends for the slight with which it had before treated him, by electing him an honorary member, exempting him from the customary payments, and sending him for the rest of his life a copy of the *Transactions*. Since the introduction of the art of printing, it would be difficult to name any discovery which has exerted a more important influence upon the industries and habits of mankind.

In consequence of complications arising from legislation affecting the taxation of the colonies Franklin was sent to England to petition the king for redress of their grievances. There he remained five years.

During this sojourn of five years in England, Franklin made many valuable friends outside court and political circles, among whom the names of Hume, Robertson and Adam Smith are conspicuous. In the spring of 1759 he received the degree of doctor of laws from the Scottish university of St. Andrews.

On October 25, 1760, King George II died, and his grandson ascended the throne. A clamor for peace followed. Franklin was for a vigorous prosecution of the war then pending with France.

Franklin sailed again for America in August, 1762, after an absence of five years, during which he had found an opportunity of visiting large portions of the continent, and of acquiring information about European affairs both in and out of England, which made him more than ever an enlightened and trustworthy authority in America upon all foreign questions affecting the interest of the colonists. The peace with the proprietary government was only temporary. The question of taxing their estates had come up in a new form, and finally resulted in a petition from the assembly drawn by Franklin himself for a change of government for Pennsylvania. The election which took place in the fall of 1764, turned upon the issue raised in this petition, and the proprietary party succeeded, by a majority of twenty-eight votes out of 4,000, in depriving Franklin of the seat to which he had been chosen for fourteen successive years in the provincial assembly. The victory, however, was a barren one, for no sooner did the assembly convene than it resolved again to send Franklin as its special agent to England to take charge of their petition for a change of government, and to look after the interests of the province abroad. On November 7th, following his defeat, he was again on his way across the Atlantic. We may as well here say at once that the petition which he brought with him for a change of government came to nothing. Franklin presented it,

and the Penns opposed it; but matters of so much graver consequence continually arose between 1765, when it was presented, and 1775, when the revolution began, that it was left to the final disposition of time. The Penns at last had the sagacity to sell betimes what they were not wise enough to keep. The State of Pennsylvania gave them £130,000 for their interest in its soil, and the British Government settled upon the head of the family a pension of £4,000 a year.

Early in the year of 1764 Grenville, the prime minister, had sent for the agents of the American colonies resident in London, and told them that the war with France which had just terminated had left upon England a debt of £73,000,000 sterling, and that he proposed to lay a portion of this burden upon the shoulders of the colonists by means of a stamp duty, unless the colonists could propose some other tax equally productive and less inconvenient. He directed the agents to write to their several assemblies for instructions upon this point. The assembly of Pennsylvania, which expressed the sentiment of all the colonies, was decidedly of the opinion that to tax the colonies, which were already taxed beyond their strength, and which were surrounded by aboriginal enemies and exposed to constant expenditures for defense, was cruel, but to tax them by a parliament in which they were not represented was an indignity. While such was their feeling, they allowed it to be understood that they would not reject any requisition of their king for aid, and if he would only signify his needs in the usual way, the assembly would do their utmost for him. These views were summed up in a "resolution" thus expressed: "that, as the assembly always had thought, so they always should think, it their duty to grant aid to the crown, according to their abilities, whenever required of them in the usual manner." To prevent the introduction of such a bill as the ministry proposed, and which Franklin characterized as "the mother of mischief," he left no stone unturned, by personal intercession, by private correspondence, and through the press. At last, in despair, he, with his associate agents, sought an interview with the minister. They found him inexorable. The government wanted the money, and it did not wish to recognize the principle upon which the colonists resisted the government method of obtaining it. The bill was introduced, and was promptly passed, only fifty voting against it in the Commons, and the Lords not dividing upon it. The sum expected from this tax being only £100,000, it was thought the colonists would soon be reconciled to it. This was evidently Franklin's hope, which he did his utmost to realize. But when the news of the passage of the Stamp Act reached the colonies, and its provisions came to be scanned, the indiscretion of those who advised it was manifest. Meetings were held in all the colonies, where resolves were passed unanimously to consume no more British manufactures until the hateful Act was repealed. For simply recommending a trusty person to collect the tax, Franklin himself was denounced, and his family in Philadelphia was in danger of being mobbed. The Act not only failed of its purpose in producing a revenue, but before it went into operation a formidable agitation for its repeal had already commenced.

The news of the repeal filled the colonists with delight, and restored Franklin to their confidence and affection. From that time until the end of his days he was, on the whole, the most popular man in America. Franklin, when he went to London in 1764, confidently expected to return in the following



year; but he was not destined to leave England till ten years later, and then with the depressing suspicion that the resources of diplomacy were exhausted. Meantime he remitted no effort to find some middle ground of conciliation. Equipped with the additional authority derived from commissions to act as the agent of the provinces of Massachusetts, of New Jersey, and of Georgia, and with a social influence never possessed probably by any other American representative at the English court, he would doubtless have prevented the final alienation of the colonies, if such a result, under the circumstances, had been possible. But under the pressure of the crown, negotiation and debate seemed rather to aggravate the differences than to remove them. Satisfied that his usefulness in England was at an end, he placed his agencies in the hands of Arthur Lee, an American lawyer practicing at the London bar, and on March 21, 1775, again set sail for Philadelphia. On his arrival collisions had occurred, some two weeks previous, between the people and the royal troops at Concord and at Lexington. He found the colonies in flagrant rebellion, and himself suddenly transformed from a peacemaker into a warmaker.

The two years which followed were among the busiest of his life. The very morning of his arrival he was elected, by the assembly of Pennsylvania, a delegate to that continental congress then sitting in Philadelphia, which consolidated the armies of the colonies, placed George Washington in command of them, issued the first continental currency, and assumed the responsibility of resisting the British government. In this congress he served on not less than ten committees. One of its first measures was to organize a continental postal system and to make Franklin postmaster-general. Thus he was avenged for his dismissal eighteen months before from the office of deputy by being appointed to a place of higher rank and augmented authority. He planned an appeal for aid from the King of the French, and wrote the instructions of Silas Deane, a member of the congress, who was to convey it; he was sent as one of three commissioners to Canada, in one of the most inclement months of the year, on what proved an ineffectual mission to persuade the Canadians to join the new colonial union; he was elected a delegate from Philadelphia to the conference which met on June 18, 1776, and which, in the name of the people of the colonies, formally renounced all allegiance to King George, and called for an election of delegates to a convention to form a constitutional government for the United Colonies. He was also one of the committee of five which drew up the "Declaration of Independence." He was also chosen president of the convention called to frame a constitution for the State of Pennsylvania, which commenced its session on July 16, 1776. He was selected by congress to discuss terms of peace with Admiral Lord Howe, who had arrived in New York harbor on July 12, 1776, to take command of the British naval forces in American waters, and on September 26th, upon the receipt of encouraging news from France, he was chosen unanimously to be one of three to repair to the court of Louis XVI. and solicit his support. His colleagues were John Adams, destined to be Washington's successor in the presidency, and Arthur Lee, Franklin's successor in the agency in London.

Franklin, now in the seventieth year of his age, proceeded to collect all the money he could command, amounting to between £3,000 or £4,000, lent it to congress, and with two grandsons set sail in the sloop of war *Reprisal* on October 27th, arriving at Nantes

on December 7th, and at Paris toward the end of the same month.

At the time of Franklin's arrival in Paris, he was already one of the most talked about men in the world. He was a member of every important learned society in Europe; he was a member, and one of the managers of the Royal Society, and one of eight foreign members of the Royal Academy of Sciences in Paris. Three editions of his scientific works had already appeared in Paris, and a new edition, much enlarged, had recently appeared in London. To all these advantages he added a political purpose—the dismemberment of the British empire—which was entirely congenial to every citizen of France. He became at once an object of greater popular interest than any other man in France—an interest which, during his eight years' sojourn there, seems always on the increase. He animated French society with a boundless enthusiasm for the cause of the rebel colonists, persuaded the government that the interests of France required her to aid them, obtained a treaty of alliance at a crisis in their fortunes in the winter of 1777, when such an alliance was decisive, and the great moral advantage of a royal frigate to convey the news of it to America. A few months later he signed the treaties which bound the two countries to mutual friendship and defense, and on the morning of March 20, 1778, the three envoys were formally received by the king at Versailles, and through them the country they represented was first introduced into the family of independent nations.

In February of the following year General Lafayette, who had distinguished himself as a volunteer in the rebel army, returning to France on leave, brought a commission from the American congress to Doctor Franklin as sole plenipotentiary of the United States to the court of France. From this time until the close of the war it was Franklin's paramount duty to encourage the French government to supply the colonists with money. How successfully he discharged this duty may be inferred from the following statement of the advances made by France upon his solicitation:—In 1777, 2,000,000 francs; in 1778, 3,000,000 francs; in 1779, 1,000,000 francs; in 1780, 4,000,000 francs; in 1781, 10,000,000 francs; in 1782, 6,000,000 francs; in all, 26,000,000 francs. To obtain these aids at a time when France was not only at war, but practically bankrupt, and in defiance of the strenuous resistance of Necker, the minister of finance, was an achievement, the credit of which, there is the best reason for believing, was mainly due to the matchless diplomacy of Franklin.

Franklin had been for some years a martyr to the gout, which, with other infirmities incident to his advanced age of seventy-five, determined him to ask congress, in 1781, to relieve him.

Congress not only declined to receive his resignation, but with its refusal sent him a commission, jointly with John Adams and John Jay, who had been the agent of congress in Spain, to negotiate a peace. Active negotiations with Franklin and his associates were opened, and on November 30th a preliminary treaty was signed by the English and American commissioners; a definite treaty was signed on September 30, 1783, and ratified by congress January 14, 1784, and by the English government on April 9th following. At the conclusion of the preliminary treaty Franklin renewed his application to congress to be relieved, to which he received no answer. A few weeks after signing the definite treaty he renewed it again, but it was not until March 7, 1785, that congress adopted the resolution which permitted "The Hon-



ourable Benjamin Franklin to return to America as soon as convenient," and three days later it appointed Thomas Jefferson to succeed him.

It was on July 12, 1785, that, accompanied by some members of his family and most intimate friends, he set out for Havre on his return to America.

On September 13th, Franklin, who had become by far the most widely known and the most eminent of Americans, disembarked again at the very wharf in Philadelphia, on which, sixty-two years before, he had landed a houseless, homeless, friendless, and substantially penniless runaway apprentice of seventeen. In the month succeeding his arrival he was chosen a member of the municipal council of Philadelphia, of which he was also unanimously elected chairman. He was soon after elected president of Pennsylvania.

At the expiration of his term in 1786, he was unanimously reelected, and again unanimously in 1787. He was also chosen a member of the national convention, of which Washington was a member and president, which met on the second Monday of May, 1787, to frame a constitution for the new confederacy. To the joint influence of Franklin and Washington probably should be ascribed the final adoption of the constitution which this convention framed. Franklin survived his retirement from office two years, which he consecrated almost as exclusively to the public use as any other two of his life, although most of the time the victim of excruciating pain. His pen was never more actively nor more effectively employed.

Franklin died in his own house, in Philadelphia, on April 17, 1790, and in the eighty-fifth year of his age.

When Franklin, the fugitive apprentice boy, in 1723, walked up Market street on the morning of his first arrival in Philadelphia, munching the rolls in which he had invested a portion of the last dollar he had in the world, the curious spectacle he presented did not escape the attention of Miss Read, a comely girl of eighteen years who chanced to be standing in the door of her father's house when he passed. Not long after, accident gave him an introduction to her; they fell in love, and, soon after his return from his trip to England, he married her. By her he had two children, a son who died young, and a daughter, Sally, who married Richard Bache, of Yorkshire, England. Mrs. Bache had eight children, from whom are descended all that are now known to inherit any of the blood of Benjamin Franklin.

Though spending more than half of his life in the public service, Franklin was never for a moment dependent upon the government for his livelihood. With the aid of his newspaper, his frugality, and his foresight, he was enabled to command every comfort and luxury he desired through his long life, and to leave to his descendants a fortune neither too large nor too small for his fame, and valued at the time of his death at about £30,000 sterling.

FRANKLIN, SIR JOHN, rear-admiral, was born at Spilsby, Lincolnshire, April 16, 1786. He received the rudiments of education at St. Ives, and afterward attended Louth Grammar School for two years; but having employed a holiday in walking twelve miles with a companion to look at the sea, which up to that time he knew only by description, his imagination was so impressed that he determined to be a sailor. In the hope of dispelling what he considered to be a boyish fancy, his father sent him on a trial voyage to Lisbon in a merchantman; but it being found on his return that his wishes were unchanged, an entry on the quarterdeck of the *Polyphemus*, seventy-four, Captain Lawford, was procured for him in 1800; and this ship having led the line in the battle of Copenhagen in 1801, young

Franklin had the honor of serving in Nelson's hardest-fought action. Two months after the action of Copenhagen, he joined the *Investigator*, discovery-ship, commanded by his relative, Captain Flinders, and under the training of that able scientific officer, while employed in exploring and mapping the coasts of Australia, he acquired a correctness of astronomical observation and a skill in surveying which proved of eminent utility in his future career. Franklin was on board the *Porpoise* when that ship and the *Cato* were wrecked, August 18, 1803, on a coral reef, off the coast of Australia. After this misfortune, Franklin proceeded to Canton, where he obtained a passage to England in the *Earl Camden*, East Indiaman, commanded by Sir Nathaniel Dance, commodore of the China fleet of sixteen sail. On February 15, 1804, Captain Dance repulsed a strong French squadron, led by the redoubtable Admiral Linois. In this action Franklin performed the important duty of signal midshipman. On reaching England, he joined the *Bellerophon*, seventy-four, and in that ship he was again intrusted with the signals, a duty which he executed with his accustomed coolness and intrepidity in the great battle of Trafalgar. In the *Bedford*, his next ship, he attained the rank of lieutenant, and, remaining in her for six years, latterly as first lieutenant, served in the blockade of Flushing, on the coast of Portugal, and in other parts of the world, but chiefly on the Brazil station, whither the *Bedford* went as part of the convoy which escorted the royal family of Portugal to Rio de Janeiro in 1808. In the ill-managed and disastrous attack on New Orleans, he commanded the *Bedford's* boats in an engagement with the enemy's gunboats, one of which he boarded and captured, receiving a slight wound in the hand-to-hand fight.

On peace being established, Franklin turned his attention once more to the scientific branch of his profession, and sedulously extended his knowledge of surveying. In 1818 the discovery of a northwest passage became again, after a long interval, a national object, and Lieutenant Franklin was appointed to the *Trent*, as second to Captain Buchan of the *Dorothea*, hired vessels, equipped for penetrating to the north of Spitzbergen, and, if possible, crossing the Polar Sea by that route. During a heavy storm both ships were forced to seek for safety by boring into the closely packed ice, in which extremely hazardous operation the *Dorothea* was so much damaged that her reaching England became doubtful; but the *Trent* having sustained less injury, Franklin requested to be allowed to prosecute the voyage alone, or under Captain Buchan, who had the power of embarking in the *Trent* if he chose. The latter, however, declined to leave his officers and men at a time when the ship was almost in a sinking condition, and directed Franklin to convoy him to England. Though success did not attend this voyage, it brought Franklin into personal intercourse with the leading scientific men of London, and they were not slow in ascertaining his peculiar fitness for the command of such an enterprise. It was with full confidence in his ability and exertion that he was, in 1819, placed in command of an expedition appointed to travel through Rupert's Land to the shores of the Arctic Sea, while Lieutenant Parry was dispatched with two vessels to Lancaster Sound. At this period, the northern coast of America was known at two isolated points only, viz., the mouth of the Coppermine River, discovered by Hearne,—but placed erroneously by him four degrees of latitude too much to the north,—and the mouth of the Mackenzie. Lieutenant Franklin, accompanied by a surgeon, two midshipmen, and a few Orkney men, embarked for Hudson's Bay, in June, 1819. His instructions left the route he was to pursue much to his



own judgment, guided by the information he might be able to collect at York Factory from the Hudson's Bay Company's servants there assembled. Wintering the first year on the Saskatchewan, the expedition was fed by the Hudson's Bay Company; the second winter was spent on the "barren grounds," the party subsisting on game and fish procured by their own exertions, or purchased from their native neighbors; and in the following summer the expedition descended the Coppermine River, and surveyed a considerable extent of the sea coast to the eastward. The survivors of this expedition traveled, from their start at York Factory to their return to it again, by land and water, 5,550 miles. While engaged on this service, Franklin was promoted to be a commander, and after his return to England in 1822 he obtained the rank of post captain, and was elected a fellow of the Royal Society. In the succeeding year he married Eleanor, the youngest daughter of Mr. Porden, an eminent architect.

In a second expedition, which left home in 1825 (his wife dying within the same year), Franklin descended the Mackenzie and traced the coast-line through thirty-seven degrees of longitude, from the mouth of the Coppermine River, where his former survey commenced, to near the 150th meridian, and approaching within 160 miles of the most easterly point attained by Captain Beechey, who was coöperating with him from Behring's Strait. His exertions were fully appreciated at home and abroad. He was knighted in 1829, received the honorary degree of D.C.L. from the university of Oxford, was awarded the gold medal of the Geographical Society of Paris, and was elected in 1846 correspondent of the Paris Academy of Sciences.

In 1836 Sir John accepted the lieutenant-governorship of Van Diemen's Land (now Tasmania). His government, which lasted till the end of 1843, was marked by several events of much interest. One of his most popular measures was the opening of the doors of the legislative council to the public.

The colonists showed their remembrance of his virtues and services by sending to Lady Franklin a subscription of £17,000 in aid of her efforts in the search for their former governor, and later still by a unanimous vote of the legislature for the erection of a statue in honor of him at Hobart Town.

Sir John found, on returning to England, that the confidence of the Admiralty in him was undiminished, as was shown by his being offered in 1845 the command of an expedition for the discovery of the north-west passage; this offer he accepted. The prestige of Arctic service and of his former experiences attracted a crowd of volunteers of all classes, from whom were selected a body of officers conspicuous for talent and energy. Thus supported, with crews carefully chosen (some of whom had been engaged in the whaling service), victualled for three years, and furnished with every appliance then known, Franklin's expedition, consisting of the *Erebus* and *Terror* (134 officers and men), with a transport ship to convey additional stores as far as Disco in Greenland, sailed from Greenhithe on May 19, 1845. The ships were last seen on July 26th, in Baffin's Bay by a whaler which was moored to an iceberg in latitude  $74^{\circ} 48' N.$  and longitude  $66^{\circ} 13' W.$ ; and at that time the expedition was proceeding prosperously. Letters written by Franklin a few days previous to that date were couched in language of cheerful anticipation of success, while those received from his officers expressed their glowing hope, their admiration of the seaman-like qualities of their commander, and the happiness they had in serving under him.

In 1847, though there was no real public anxiety as to the fate of the expedition, preparations began to be

made for the possible necessity of succoring the explorers. As time passed, however, and no tidings of the expedition reached England, the search began in earnest; expedition after expedition was dispatched in quest of them in 1848 and succeeding years, regardless of cost or hazard. In this great undertaking Sir John's heroic (second) wife took a part which will ennoble her name for all time. Between 1848 and 1854 about fifteen expeditions were sent out by England and America in the hope of rescuing, or at least finding traces of, the missing explorers. Lady Franklin's exertions were unwearied; she exhausted her private funds in sending out auxiliary vessels to quarters not comprised in the public search, and by her pathetic appeals she roused the sympathies of the whole civilized world. Traces of the missing ships were discovered by Ommanney and Penny in August, 1850, and were brought home by the *Prince Albert*, fitted out by Lady Franklin with the especial object of following to the southward the route which would be almost certainly taken by Franklin in carrying out his instructions. It was thus ascertained that the first winter had been spent behind Beechey Island, where they had remained at least as late as April, 1846. No further tidings were obtained until the spring of 1854, when Doctor Rae, then conducting an exploring party of the Hudson Bay Company from Repulse Bay, was told by the Eskimo that (as was inferred) in 1850 white men, to the number of about forty, had been seen dragging a boat over the ice near the north shore of King William's Island, and that later in the same season, but before the breaking up of the ice, the bodies of the whole party were found by the natives at a point a short distance to the northwest of Back's Great Fish River, where they had perished from the united effect of cold and famine. The latter statement was afterward disproved by the discovery of skeletons upon the presumed line of route; but indisputable proof was given that the Eskimo had communicated with members of the missing expedition, by the various articles obtained from them and brought home by Doctor Rae, who, on his return to England, claimed, and succeeded in obtaining, the reward of £10,000 offered by the Admiralty in 1849, "to any party or parties who, in the judgment of the Board of Admiralty, shall, by virtue of his or her efforts, first succeed in ascertaining" the fate of the missing expedition. On account of the information obtained by Doctor Rae, a party in two canoes under Messrs. Anderson and Stewart was in 1855 sent by government down the Great Fish River, and they succeeded in obtaining from the Eskimo at the mouth of the river a considerable number of articles which had evidently belonged to the Franklin expedition; and many others were picked up on Montreal Island, articles evidently belonging to a boat which, it was reported, had been cut up by the Eskimo. This expedition was unable to make so thorough a search as was desirable, but it was clear from the results obtained by it, and from the examinations which had been made by the many other expeditions of all straits and inlets and coasts except the region to the north of Great Fish River, that King William's Island, the west coast of Boothia, and the neighboring sea were the fields likely to yield the most satisfactory results. It was clear that a party from the *Erebus* and *Terror* had endeavored to reach by the Fish River route the settlements of the Hudson Bay Company, and equally evident that the expedition in making a southerly course had been arrested within the channel into which the Great Fish River empties itself. At this time government was wholly taken up with the events in the East, and when the war was over it was deemed useless to spend any more money and risk any more lives in what was regarded as a hopeless quest. But Lady



Franklin's pious devotion to the memory of her noble husband prompted her to make one last effort to ascertain his fate; to this object she dedicated all her available means, aided, as she had been before, by the subscriptions of sympathizing friends, her judgment being confirmed by the opinion of all those best able to form one as to the hopefulness as well as the feasibility of such an attempt. Accordingly, she purchased and fitted out the little yacht *Fox*, which sailed from Aberdeen in July, 1857; the command was accepted by Captain (afterward Sir) Leopold M'Clintock, whose high reputation had been won in three of the government expeditions sent out in search of Franklin. Having been compelled to pass the first winter in Baffin's Bay, it was not till the autumn of 1858 that the expedition passed down Prince Regent's Inlet, and the *Fox* put into winter quarters at Port Kennedy, at the eastern end of Bellot Strait, between North Somerset and Boothia Felix. In the spring of 1859 three sledging parties went out, Captain (now Sir) Allen Young to examine Prince of Wales Island, Lieutenant (now Captain) Hobson the north and west coasts of King William's Island, and M'Clintock the east and south coasts of the latter, the west coast of Boothia, and the region about the mouth of Great Fish River. The search was successful so far as ascertaining the course and fate of the expedition is concerned. From the Eskimo in Boothia many relics were obtained, and reports as to the fate of the ships and men; all along the west and south coast of King William's Island remains of articles belonging to the ships were discovered, and skeletons that told a terrible tale of disaster. Above all, in a cairn at Point Victory a precious record was discovered by Lieutenant Hobson that briefly told the history of the expedition up to April 25, 1848, three years after it set out full of hope. In 1845-6 the *Erebus* and *Terror* wintered at Beechey Island on the southwest coast of North Devon, in latitude  $74^{\circ} 43' 28''$  N., longitude  $91^{\circ} 36' 15''$  W., after having ascended Wellington Channel to latitude  $77^{\circ}$  and returned by the west side of Cornwallis Island. This statement was signed by Graham Gore, lieutenant, and Charles F. Des Vœux, mate, and bore date May 28, 1847. These two officers and six men, it was further told, left the ships on May 24, 1847, no doubt for an exploring journey, at which time all was well.

The success of the first year's work, thus briefly stated, was greater than has been since attained within any one season in arctic service. The alternative course permitted by Franklin's instructions had been attempted but was not pursued, and in the autumn of 1846 he followed that which was especially commended to him. But on his attempting to reach the coast of America, the obstruction of heavy ice, which presses down from Melville Island through M'Clintock Channel (not then known to exist) upon King William's Island, had finally arrested his progress. It must be remembered that in the chart carried out by Franklin, this island was laid down as a part of the mainland of Boothia, and he therefore could pursue his way *only* down its western coast. The record that revealed all which has been briefly stated was written upon one of the forms supplied by the Admiralty to surveying vessels, to be thrown overboard after the required data had been filled in. But upon the margin around the printed form was an addendum dated April 25, 1848, which extinguished all hopes of a successful termination of their grand enterprise. The facts are best conveyed by the terse and expressive words of the record, which is, therefore, given *verbatim*:—"April 25, 1848. Her majesty's ships *Terror* and *Erebus* were deserted on April 22d, five leagues north-northwest of this, having been beset since September 12, 1846. The officers and crews, con-

sisting of 105 souls, under the command of Capt. F. R. M. Crozier, landed here in latitude  $69^{\circ} 37' 42''$  N., longitude  $98^{\circ} 41'$  W. Sir John Franklin died June 11, 1847; and the total loss by deaths in the expedition has been to this date nine officers and fifteen men." The handwriting is that of Captain Fitzjames, to whose signature is appended that of Captain Crozier, who also adds the words of chief importance, namely, that they would "start on to-morrow, April 26, 1848, for Back's Fish river." A briefer record has never been told of so tragic a story.

**FRANKLIN, THE BATTLE OF.** After the Chattanooga campaign had ended, and General Grant had been made commander-in-chief of the Federal armies, General Sherman withdrew his army from Hood's front, and started upon his march to the sea. Lee was confronting Grant at Richmond, and to hold all the country which had been wrested from the Confederacy between the Mississippi and Chattanooga, Sherman had left Thomas with a force only slightly exceeding 20,000 men. These men were scattered at various points in the region indicated, and to operate against them Hood had a force numbering more than twice as many. His army had been re-enforced, and the Confederate Government was contemplating a move on the Ohio, and an invasion of the territory held by the Union troops. In addition to Hood's army Kirby Smith had been ordered to bring up his command from west of the Mississippi, in order to force to a successful conclusion this invasion. The value of a Confederate victory at this time would have been particularly great, as it would, it is believed by many, have had the effect of securing an alliance between the French, who were then occupying Mexico, and the Confederate States—if, indeed, it had not secured the co-operation of other European powers. The bulk of Thomas' army under General Schofield, numbering 18,000 men, was strung out in a line fifty miles in length, reaching from Pulaski to Centerville, on Duck river. General Schofield had received instructions from General Thomas, in the event of Hood's attempt to turn his flank, to fight at Columbia; but if the attack was made in another direction to fight at Pulaski. Between Hood and Nashville the only Union forces were four small cavalry brigades. Thomas' object was to delay Hood until he could concentrate the Union army at some given point and receive re-enforcements both of recruits and of the army in Missouri under the command of A. J. Smith. The outlook for the Federal army was very discouraging; for to add to the seriousness of the situation there was not only a great disparity of numbers, but on account of the scattered condition of Thomas' troops and the number of important posts to be held, it was a work of great difficulty (owing to the state of the weather and condition of the roads) to move troops to any common point. Hood lay on the south bank of the Tennessee in command of the crossing at Florence. He advanced to the north bank, and, pushing forward, forced Schofield back on Columbia, and while feigning a direct attack upon the Union front threw seven divisions of infantry and a heavy force of cavalry over the Duck, and succeeded in attaining the Union rear. The destruction or capture of the Union army seemed certain, but the errors of Hood's division commanders and the determined resistance of General Stanley's (Federal) command enabled Schofield to fall back upon Franklin, to which point he was directed by General Thomas to retire. After crossing the river Hood moved at day-break, with his seven divisions, to Spring Hills, twelve miles in Schofield's rear and on his line of retreat to Franklin. As Hood entered the place from the west General Stanley, with one division of the old army of



the Cumberland came up from the south. Schofield's troops were strung out for a distance of twelve miles, and encumbered with wagon trains. Stanley made a gallant fight from early in the afternoon till 7 p. m., holding the Confederates in check for seven hours, giving Schofield time to bring up his scattered forces. As night fell, however, matters did not seem much better for the Union forces, for there were seven divisions of the Confederate army on its front and flank and two in its rear. But, under cover of Stanley's determined stand, the army succeeded in retreating in safety as far as Franklin, where a stand was made, a portion of the Union army facing about, and where was fought one of the bloodiest battles of the war—all things considered, one of the most remarkable conflicts of the entire four years. The Union forces were posted in a single intrenched line, with only one brigade in reserve, and with two brigades stationed in the open field, covered by a slight breastwork a third of a mile in front of the main line. Their flanks rested on the Harpath river, and the intention was to cover the crossing of the trains, and to hold the enemy in check until night should allow the whole force to withdraw under cover of darkness. When Hood's army came up, it was formed in column of attack, and at once moved down in good order and in overwhelming numbers on the Union position. The two advanced brigades were enveloped and brushed away—forced back over the intrenchments, both armies amalgamating in a confused mass. Federal batteries were siezed and turned so as to enfilade the Union lines. Fortunately one of the retreating brigades, as it was driven over the parapet, turned, and firing a volley into the Confederates, manned part of the vacated works. Then the reserve brigade was ordered to charge by its immediate commanding officers, and, although suffering fearfully, drove the Confederates at the point of the bayonet back over the works. The Union guns were retaken and turned on the Confederates with fearful effect. Several times did Hood's charging columns endeavor to dislodge the Federals, but in vain, and when night fell upon the scene Hood had lost over seventeen hundred men killed, including five generals, and four thousand wounded, among whom were six generals. The Union loss was stated to be fifteen hundred.

The remainder of the army having crossed the river by this time, the forces which had been engaged in the conflict were under cover of darkness withdrawn within the defenses of Nashville, where a short time after Hood was totally defeated by Thomas. The date of the battle of Franklin was November 30, 1864.

**FRANKS, THE.** Frank is, probably, the newest of all German names, and represents, somewhat vaguely, a group of tribes who dwelt about the lower and middle Rhine. The Franks lived in districts previously occupied by tribes bearing other names; nor have we proof of any incursion of a strange tribe called Franks from north or east. The old Frankish legend that they came from the Danube to the Rhine probably arose from the fact that a colony of the Sicambrian cohort was planted by the Romans on the spot where Buda-Pesth now stands. The meaning and origin of the term also lends itself to the view above stated—the words "frank and free," usually grouped together, are in fact the same in origin and meaning.

**FRANZEN, FRANS MICHAEL (1772–1847),** Swedish poet, was born in Uleaborg in Finland. He died at Säbra parsonage. Franzén was a true lyric poet, fixing with masterly art the fleeting traits of common life in a glorified and fascinating form.

**FRANZENSBAD, KAISER-FRANZENSBAD, EGER-BRUNNEN,** and formerly **SCHLADAER SAUERLING,** a

well-known Bohemian watering-place which owes its most popular name to the emperor Francis II. It is a little over three miles northwest of Eger, at a height of about 1,500 feet above the sea.

**FRASCATI,** a town of Italy, in the province of Rome and about ten and a half miles south of the city, with a station at the terminus of a branch railway from the main line between Rome and Naples.

**FRASER, JAMES BAILLIE (1783–1856),** Scottish diplomatist, traveler, and author, was born in Reelick or Relig, in the county of Inverness. The works by which he attained his literary reputation were accounts of his travels and fictitious tales illustrative of Eastern life. In both he employed a vigorous and impassioned style, which was on the whole wonderfully effective in spite of minor faults in taste and flaws in structure. Some of his tales have not yet altogether lost their popularity.

**FRASER, SIMON.** See **LOVAT.**

**FRASERBURGH,** a seaport town of Scotland, Aberdeenshire. Population, 5,000.

**FRASER RIVER,** the principal river of British Columbia, is formed by two branches, the chief of which rises in the Rocky mountains in 53° 45' N. latitude, and 119° longitude. The branches unite near Fort George, whence the stream flows in a southern direction, and after a course of 800 miles falls into the Georgian Gulf in 49° N. latitude. The salmon fishery is of importance.

**FRATRICELLI** was a common name given to a number of obscure mediæval sects who flourished in the thirteenth and fourteenth centuries. They were also called Bioschi, Bighini, Bocasoti, Frèrots, etc., and included such sects as the Brethren of the Full Spirit, the Brethren of the Free Spirit, the Beghards, the Brethren of the Common Life, etc. The history of these mediæval sects is very obscure; but it seems now made out that while they had some relation to and sympathy with the older Cathari and other Manichæan heretics, they had a distinct origin in the Franciscan order, and that their real aim was to carry out the principles of St. Francis even in defiance of the court of Rome.

**FRAUD,** in law, is a word of wide import, to which it is difficult to assign any exact definition. The courts have in fact deliberately refrained from defining it, because they did not wish to limit their power of dealing with fraudulent transactions. The word, however, carries its own meaning on the face of it, and there is practically no difference between fraud in the popular and fraud in the legal sense. Any course of conduct that would generally be described as dishonest, any cheating or deceiving another so that he would be injured thereby, would be fraud in law as in common parlance.

The essential element in fraud is misrepresentation—producing a false impression on the mind of another—causing him to believe that which is not true. And misrepresentation, to amount to fraud, must also be intentional.

It is in reference to contracts that the legal treatment of fraud is of the greatest importance. The broad rule is, that any contract tainted by fraud is void, at the option of the party injured. Innocent misrepresentation, in the sense above defined, has no such effect on a contract—has, in general, no effect at all, unless in certain exceptional cases. Thus, if the representation is a *condition*, the contract is avoided if it turn out not to be true. Or, if it is a *warranty*, its falsehood will give a right of action for the breach thereof. And so in certain other cases. But willful misrepresentation or fraud taints the whole contract.

**FRAUENBURG,** a town of Prussia, province of East Prussia, government district of Königsberg, is sit-



uated on the Frische Haff, and at the mouth of the Baude, forty-one miles southwest of Königsberg.

**FRAUENFELD**, a town of Switzerland, capital of the canton of Thurgau (or Thurgovia), is situated in a beautiful and fertile district on the Murg, twenty-three miles northeast of Zurich. It is the artillery depot for east Switzerland, and possesses an old castle with a tower belonging to the tenth century, an old Capuchin monastery, a town-house, an armory, and a canton school. Population (1890), 4,460.

**FRAUENLOB**, the name by which a German poet of the thirteenth century is almost exclusively known, though his real name was Heinrich von Meissen. Frauenlob was born in 1260 of a humble burgher family. He died in 1318, and was buried in the cloisters of the cathedral at Mainz. His grave is still marked by a copy made in 1783, of the original tombstone of 1318; and in 1842 a monument by Schwanthaler was erected by the ladies of the city in another part of the cloisters.

**FRAUNHOFER**, **JOSEPH VON**, a celebrated optician, was born at Straubing in Bavaria, March 6, 1787. His father, a poor glazier, having died in 1798, young Fraunhofer in August of the following year was apprenticed to Weichselberger, a glass-polisher and looking-glass maker. Having by day no time that he could call his own, he studied the few old books that he possessed during leisure snatched from sleep. On July 21, 1801, he nearly lost his life by the fall of a house in which he lodged, and the elector of Bavaria, Maximilian Joseph, who was present at his extrication from the ruins, gave him eighteen ducats. With a portion of this sum he obtained release from the last six months of his apprenticeship, and with the rest he purchased a glass-polishing machine. He now employed himself in making optical glasses, and in engraving on metal, devoting his spare time to the perusal of works on mathematics and optics. In 1806 he obtained the place of optician in the mathematical institute which in 1804 had been founded at Munich by Joseph von Utzschneider, G. Reichenbach, and J. Liebherr; and in 1807 arrangements were made by Utzschneider for his instruction by Pierre Louis Guinand, a skilled optician, in the fabrication of flint and crown glass, in which he soon became an adept. With Reichenbach and Utzschneider, Fraunhofer established in 1809 an optical institute at Benedictbeuern, near Munich, of which he in 1818 became sole manager. The institute was in 1819 removed to Munich, and on Fraunhofer's death came under the direction of G. Merz. Among the earliest mechanical contrivances of Fraunhofer was a machine for polishing mathematically uniform spherical surfaces. He was the inventor of the stage-micrometer, and of a form of heliometer; and in 1816 he succeeded in constructing for the microscope achromatic glasses of long focus, consisting of a single lens, the constituent glasses of which were in juxtaposition, but not cemented together. The great reflecting telescope at Dorpat was manufactured by Fraunhofer, and so great was the skill he attained in the making of lenses for achromatic telescopes that, in a letter to Sir David Brewster, he expressed his willingness to furnish an achromatic glass of eighteen inches' diameter. For his researches published in the *Denkschriften der Münchener Akademie* for 1814-15, by which he laid the foundation of solar and stellar chemistry, Fraunhofer is especially known. The dark lines of the spectrum of sunlight, earliest noted by Doctor Wollaston were independently discovered, and, by means of the telescope of a theodolite, between which and a distant slit admitting the light a prism was interposed, were for the first time carefully observed by Fraunhofer, and have on that account been designated "Fraunhofer's lines."

He constructed a man of as many as 576 of these lines, the principal of which he denoted by the letters of the alphabet from A to G; and by ascertaining their refractive indices he determined that their relative positions are constant, whether in spectra produced by the direct rays of the sun, or by the reflected light of the moon and planets. The spectra of the stars he obtained by using, outside the object-glass of his telescope, a large prism, through which the light passed to be brought to a focus in front of the eye-piece. He showed that in the spectra of the fixed stars many of the dark lines were different from those of the solar spectrum, while other well-known solar lines were wanting; and he hence concluded that it was not by any action of the terrestrial atmosphere upon the light passing through it that the lines were produced. In 1823 he was appointed conservator of the Physical Cabinet at Munich, and in the following year he received from the king of Bavaria the civil order of merit. He died at Munich, June 7, 1826.

**FRAUSTADT**, a garrison town, and the chief town of a circle in the government district of Posen, Prussia, is situated in a flat, sandy country fifty miles south-southwest of Posen. Population (1890), 6,800.

**FRAYSSINOUS**, **DENIS ANTOINE LUC**, **COMTE DE**, a Gallican prelate and Bourbonist minister, distinguished as an orator and as a controversial writer, was born of humble parentage at Curières, in the department of Aveyron. He died at St. Géniez, December 12, 1741.

**FREDERICIA**, or **FRIDERICIA**, a fortified town of Denmark, near the southeast corner of Jutland, on the shores of the Little Belt. Population, 8,000.

**FREDERICK**, the county-seat of Frederick county, Maryland, is situated forty-four miles northwest of Washington, D. C., and sixty miles west by north of Baltimore, at the intersection of several railroads. The city is well built, with wide streets and some fine public buildings, including a city hall, county courthouse, and the State Deaf and Dumb Institute. The manufacturing industries include tanneries, foundries, sash factories, flouring mills, and manufactures of brick, wagons, and carriages. Two daily and three weekly newspapers are published here. There are five national and two savings banks. Population in 1890, 8,193.

**FREDERICK**, in German **FRIEDRICH**, the name, signifying Rich in Peace, borne by a considerable number of European (principally German) sovereigns. The most important of these, including the compound names Frederick Augustus and Frederick William, are noticed here in the following order: the emperors, the electors of Brandenburg and kings of Prussia, the electors and kings of Saxony, and the electors palatine.

**FREDERICK I.**, surnamed by the Italians **Barbarossa**, Holy Roman emperor, and one of the greatest of German sovereigns, was the son of Frederick the One-eyed of Hohenstaufen, duke of Swabia, and of Judith, daughter of Henry the Black, duke of Bavaria, and was born most probably in 1123. He succeeded his father as duke of Swabia in 1147, and in the same year accompanied his uncle Conrad III. on his disastrous crusade. As in addition to his exceptional personal qualities Frederick possessed the advantage of uniting in himself the blood of the two great rival families, the Guelphine and the Ghibelline, Conrad III., though possessing an infant son, nominated him as his successor. On the death of Conrad this choice was unanimously ratified by the assembly at Frankfort, March 4 or 5, 1152, and on the 9th of the same month Frederick received the crown of Germany at Aix-la-Chapelle.

The major part of his long reign was spent in wars, principally with Italian principalities and other neigh-



boring powers, the outcome of most of which struggles was the augmentation of his dominions by vast additions of territory and population. His attitude toward the popes was also another factor of disquiet, as he was almost constantly embroiled in the support of one or the other faction, which disputed supremacy of the papal see. His success was signalized by the attainment of the crown of Italy, in 1186, for his oldest son Henry, after having failed in five attempts to obtain possession of that country.

Having thus at last brought his long life-struggle to an honorable if not very triumphant close, it might have been expected that Frederick would now have been content to doff his armor, and to pass his remaining days in peace. But hearing in 1187 of the victorious progress of Saladin against the Christians in Syria, his martial ardor was again kindled, and he resolved to enter the lists against the redoubtable Saracen conqueror. This purpose he was, however, unable to carry fully out, for after two successful battles in Asia Minor, he was drowned before reaching Syria while crossing a small river in Pisidia, June 10, 1190.

Frederick I. is said to have taken Charlemagne as his model; but the contest in which he engaged was entirely different both in character and results from that in which his great predecessor achieved such a wonderful temporary success. Though Frederick failed to subdue the Italian republics, the failure can scarcely be said to reflect either on his prudence as a statesman or his skill as a general, for his ascendancy was finally overthrown rather by the ravages of pestilence than by the might of human arms. In Germany his resolute will and sagacious administration subdued or disarmed all discontent, and he not only succeeded in welding the various rival interests into a unity of devotion to himself against which papal intrigues were comparatively powerless, but won for the empire a prestige such as it had not possessed since the time of Otto the Great. The wide contrast between his German and Italian rule is strikingly exemplified in the fact that, while he endeavored to overthrow the republics in Italy, he held in check the power of the nobles in Germany, by conferring municipal franchises and independent rights on the principal cities. Even in Italy, though his general course of action was warped by wrong prepossessions, he in many instances manifested exceptional practical sagacity in dealing with immediate difficulties and emergencies. Possessing great physical beauty, frank and open manners, untiring and unrelenting energy, and a prowess which found its native element in difficulty and danger, he seemed the embodiment of the chivalrous and warlike spirit of his age, and was the model of all the qualities which then won highest admiration. Stern and ambitious he certainly was, but his aims can scarcely be said to have exceeded his prerogatives as emperor; and though he had sometimes recourse when in straits to expedients almost diabolically ingenious in their cruelty, yet his general conduct was marked by a clemency which in that age was exceptional. His quarrel with the papacy was an inherited conflict, not reflecting at all on his religious faith, but the inevitable consequence of inconsistent theories of government, which had been created and could be dissipated only by a long series of events.

FREDERICK II., Holy Roman Emperor, surnamed the Hohenstaufen, the most remarkable historic figure of the Middle Ages, grandson of the preceding, and son of Henry VI. and of Constance, heiress of the throne of Sicily, was born at Jesi, near Ancona, December 26, 1194. He was elected king of the Romans in 1196; and, his father having died September 28, 1197, he was in May, 1198, crowned king of Sicily. At a

diet held at Nuremberg, in October 1211, it was resolved to offer the crown of Germany to the young king of Sicily, who in July, 1215, ascended the marble throne of Charlemagne at Aix-la-Chapelle, and received the silver crown. At a solemn ceremony which followed he took the cross; but even after the death of Otto, in May, 1218, he was fully occupied in establishing his influence in Germany. In 1220 he succeeded in obtaining the election of his son Henry to the German throne.

The departure of the crusade, at first fixed for 1223, was deferred till 1225, and even then it was found necessary to delay it for two years longer; but, his wife Constance having died in 1222, he gave a pledge that his ambition coincided with the papal wishes by marrying in 1225 Yolande, daughter of King John of Jerusalem; and he also bound himself by heavy penalties to set out with a stipulated force in August, 1227. Frederick actually set out at the time agreed upon, but returned three days afterward, and, asserting as his reason a serious illness, permitted the armament to be dissolved, whereupon Gregory without further negotiation launched against him, September 30th, the solemn bull of excommunication. In resolving to set out on the crusade, notwithstanding his excommunication, Frederick was actuated, not merely by the wish to take possession of a secular throne, or to demonstrate the sincerity of his purpose to keep his oath, but by the determination to assert his right still to act as the temporal head of the church. His preparations were not delayed by the death of his wife Yolande in April, 1228, and he set sail from Otranto on June 29th. Meanwhile, by securing the favor of the Frangipani and the other Roman patricians, he procured the expulsion of Gregory from Rome; but the subtle spiritual influence of the papal ban was not affected by this seeming victory, and tidings of his excommunication reaching the Holy Land almost simultaneously with his arrival, the Knights of the Temple and the Hospital refused to take part in the crusade. Frederick, however, by mere diplomatic tact, succeeded in persuading the sultan of Egypt to agree to a treaty, by which the church obtained possession of Jerusalem and the holy places on granting to the Saracens, besides various other privileges, free access to Bethlehem; and on March 18, 1229, he, without any religious ceremony, crowned himself with his own hands king of Jerusalem. Such a striking and unexpected success wrought almost immediately throughout Europe a complete revolution of opinion in his favor; and when shortly afterward he succeeded in defeating the papal forces which had invaded his dominions, the pope deemed it expedient to come to terms, and released him from the ban of excommunication in 1230.

In the interval of peace which followed, Frederick occupied himself in forming for his Sicilian kingdom a code of laws, the main features of which were the superseding of irresponsible feudal and ecclesiastical jurisdictions by a uniform civil legislation administered under direct imperial control; the toleration extended to Jews and Mahometans, and the severe enactments against schismatics; the provisions for the emancipation of the peasants; the regulations for the encouragement of commerce, which contain perhaps the first enunciation of the modern doctrine of free trade; and the establishment of annual parliaments, consisting of barons, prelates, and representatives from the towns and cities. He also devoted much of his attention to the advancement of learning and of the arts and sciences. The university of Naples, founded in 1224, but whose operations had been for some time suspended, he now restored and liberally endowed; at the medical schools of Salerno he provided Arab, Latin, Greek, and Hebrew



teachers for the students of these different nationalities; and he caused the translation into Latin of the works of Aristotle and of other philosophers both Greek and Arabic.

The short period of peaceful progress was broken in 1234 by the rebellion of Frederick's son Henry, who, secretly instigated by the pope, joined the Lombard league. The revolt was, however, suppressed on the arrival of the emperor in Germany in 1235; and Henry was sent as a prisoner to the castle of San Felice in Apulia. In the same year Frederick married Isabella, sister of Henry III. of England. Conrad, second son of the emperor, was chosen king by the German princes in January, 1237; and Frederick, after the disastrous defeat of the Lombards at Cortenuova, November 27th of this year, appointed, in October, 1238, his natural son Enzo, king of Sardinia. Alarmed at the success of the imperial arms, Gregory, in March, 1239, renewed against the emperor the ban of excommunication; but the latter advancing into the states of the church, captured Ravenna, Faenza, and Benevento; and after gaining, through the help of Enzo, a brilliant victory over the Genoese fleet, was nearing Rome when Gregory died August 21, 1241. After the short pontificate of Celestine IV. and an interregnum of eighteen months, Cardinal Sinibald Fiesco, up to this time one of the emperor's chief friends, became pope as Innocent IV. in June, 1243. At once negotiations were entered into for an arrangement between them; but the papal demands were too humiliating to permit of their acceptance; and Innocent, suddenly making his escape to Lyons, not only renewed, July 17, 1245, the church's ban against the emperor, but declared his throne vacant. Henry Raspe of Thuringia, elected by the papal party king of the Romans in May, 1246, gained a victory over Conrad at Frankfort on August 5th, but, suffering a total defeat near Ulm, February 17, 1247, died shortly afterward; and between his successor William of Holland and Conrad the struggle was carried on with indecisive results. In this same year Peter de Vineia, the minister and most intimate friend of Frederick, was discovered plotting against his life; on February 18, 1248, Frederick's army in Italy was surprised and utterly routed by a sally of the citizens of Parma; in May, 1249, his son Enzo was defeated and captured by the Bolognese; and, although in 1250 various successes in the north of Italy and the prospect of new and powerful alliances seemed to promise him a speedy and complete triumph, his strength had been so worn out by his arduous struggle, and his spirit so broken by such a succession of disasters that he died somewhat suddenly on December 13th, at his hunting lodge of Fiorentino (also called Firenzuola), near Lucera.

**FREDERICK III.** (1286-1330), surnamed the Fair, son of King Albert I. of Germany, duke of Austria, and rival for the German crown with Louis IV. the Bavarian. (See LOUIS IV.)

**FREDERICK IV.**, German king, as emperor Frederick III., son of Duke Ernest of Styria, was born at Innsbruck, September 21, 1415. Along with his brother Albert the Prodigal he assumed, in 1435, the government of Styria, Carinthia, and Carniola, and, having been elected in 1440 to succeed Albert II. as king of Germany, he was crowned at Aix-la Chapelle in 1442. He was crowned emperor in 1452. Frederick died in 1493.

**FREDERICK WILLIAM**, elector of Brandenburg, was born in Berlin in 1620. He is usually called "The Great Elector," and, next to Frederick the Great, he was the chief founder of the power of Prussia. When, at the age of twenty (1640), he succeeded to the electorate, he found it almost ruined. It was universally ad-

mitted that he was the true heir of the dukes of Pomerania, whose line died out in 1637; but at the Peace of Westphalia the lion's share of their territory was ceded to Sweden, Frederick William receiving only the eastern half of the country, shorn of Stettin. But he also obtained the bishoprics of Halberstadt, Minden, and Camin, with a promise of the archbishopric of Magdeburg. In 1655 war broke out between Sweden and Poland. Charles Gustavus, king of Sweden, compelled Frederick William to join him, and to do homage for Prussia, which had formerly been held in fief of Poland. After a battle of three days at Warsaw, the Poles were defeated (1656). In the following year the elector concluded an alliance with the Poles, receiving, by the treaty of Wehlau, in return for the promise of his aid, an acknowledgment of the complete independence of Prussia. In 1666 he received, by the settlement of the Jülich-Cleve dispute, the duchy of Cleve proper, and the counties of Mark and Ravenstein; while Jülich and Berg were to fall to Brandenburg in the event of the Pfalz-Neuburg line dying out.

In 1674 he drove the Swedes not only from Brandenburg but from Pomerania, of which he became complete master. Between three and four years afterward (about Christmas, 1678) they invaded Prussia, threatening Königsberg. In the dead of winter Frederick started from Berlin with a powerful force, and in the middle of January, 1679, finally beat them, crossing the Frische Haff with 4,000 men on sledges. After all, however, he did not obtain Pomerania, for when the peace of St. Germain-en-Laye was concluded in 1679, Louis XIV. insisted on its being restored to his ally, the king of Sweden. Frederick William, indignant at Austria for allowing this, maintained for a time an alliance with France; but he had ultimately to cultivate the friendship of the emperor, from whom he hoped to obtain the Silesian principalities of Liegnitz, Brieg and Wohlau, which, after 1675, he claimed as his by inheritance. He received the circle of Schwiebus, in Silesia (1686), on condition that he should withdraw his claim and send 8,000 men to the help of the emperor in his war with the Turks. Two years afterward he died.

**FREDERICK I.**, the first king of Prussia, was born at Königsberg, 1657. He was the son of the Great Elector by his first marriage. In consequence of a fall from the arms of his nurse his spine was so seriously injured that he was deformed for life. In the course of his reign he exercised considerable influence on European politics by placing auxiliary forces at the disposal of friendly princes. For years he endeavored to induce the emperor Leopold I. to recognize him as king of Prussia. At last, in November, 1700, the emperor consented, insisting, however, on various strict conditions, one of which was that in the approaching war of the Spanish succession Prussia should contribute a force of 10,000 men to the Austrian army. Immediately after receiving the imperial sanction, Frederick started with his whole court for Königsberg, where, on January 18, 1701, with much ceremony, he crowned himself. He sent 20,000 men into the war of the Spanish succession, and a portion of them did excellent service at the battle of Blenheim. Frederick died on February 25, 1713.

**FREDERICK WILLIAM I.**, king of Prussia, son of Frederick I., by his second marriage, was born in 1688. He was soon imbued with a passion for military life, and this was deepened by acquaintance with the duke of Marlborough and Prince Eugene, whom he visited during the siege of Tournay. In 1715 he was forced, in alliance with Russia, Saxony and Denmark, into a war with Charles XII. of Sweden, in consequence of which, in return for two million thalers paid to Sweden, he obtained the islands of Wollin and Usedom,



Stettin, and part of Swedish Pomerania. This was his only war. He despised many things which the modern world holds in high esteem, and was often coarse, violent, and fond of hideous practical jokes. Nevertheless, Prussia profited immensely by his reign. He saw the necessity of rigid economy, not only in his private life, but in the whole administration of the state; and the consequence was that he paid off the debts incurred by his father, and left to his successor an overflowing treasury. He did nothing for the higher learning, and even banished the philosopher Wolf at forty-eight hours' notice, "on pain of the halter," for teaching, as he believed, fatalist doctrines; but he established many village schools, and he encouraged industry by every means in his power, particularly agriculture. Under him the nation flourished, and, although it stood in awe of his vehement spirit, it respected him for his firmness, his honesty of purpose, and his love of justice. He was devoted to his army, the number of which he raised from 48,000 to 83,500; and there was not in existence a more thoroughly drilled or better appointed force. He died May 31, 1740, leaving behind him his widow, Sophie Dorothea of Hanover, and a numerous family.

FREDERICK II., king of Prussia, born on January 24, 1712, was the son of Frederick William I., and is usually known as Frederick the Great. He was brought up with extreme rigor, his father devising a scheme of education which was intended to make him a hardy soldier, and prescribing for him every detail of his conduct. As he grew up he became extremely dissatisfied with the dull and monotonous life he was compelled to lead; and his discontent was heartily shared by his sister, Wilhelmina, a bright and intelligent young princess for whom Frederick had a warm affection. Frederick William, seeing the divergence of his son's tastes from his own, gradually conceived for him an intense dislike, which often found expression in violent outbursts of anger. So harsh was his treatment that Frederick frequently thought of running away and taking refuge at the court of his uncle, George II. of England; and he at last resolved to do so during a journey which he made with the king to South Germany in 1730, when he was eighteen years of age. He was helped by his two friends, Lieutenant Katte and Lieutenant Keith; but by the imprudence of the former the secret was found out. Frederick was placed under arrest, and the king abused him so cruelly on board a yacht at Frankfurt that some courtiers had to interfere, and to separate them. Warned by Frederick, Keith escaped; but Katte delayed his flight too long, and a court martial decided that he should be punished with two years' fortress arrest. The king changed this sentence into one of death, and the young soldier was executed outside the fortress of Cüstrin, in which Frederick was kept a close prisoner. The same court martial which had judged him decided that, as a lieutenant-colonel attempting to desert, the crown prince had incurred the legal penalty of death. For some time the king actually thought of giving effect to the sentence; and he at last relented only in consequence of grave expostulations from the emperor and the kings of Sweden and Poland.

For about fifteen months Frederick now lived in the town of Cüstrin, having an establishment of his own, but serving as the youngest councilor at the government board there. He took great care not to offend his father, and was partially restored to favor. In 1732 he was made colonel commandant of a regiment in Ruppin, and in the following year he married, in obedience to the king's orders, the Princess Elizabeth Christina, daughter of the duke of Brunswick-Bevern. The palace of Rheinsberg in the neighborhood of Ruppin was

built for him, and there he lived until he succeeded to the throne.

In 1740 he became king. He maintained all the forms of government established by his father, but ruled in a far more liberal and enlightened spirit. On the year of his accession, the emperor Charles VI. died. Frederick at once began to make extensive military preparations, and it was soon clear to all the world that he intended to enter upon some serious enterprise. He had made up his mind to take possession of Silesia.

Frederick sent an ambassador to Vienna, offering, in the event of his rights in Silesia being conceded, to aid Maria Theresa against her enemies. The queen of Hungary, who regarded the proposal as that of a mere robber, haughtily declined; whereupon Frederick immediately invaded Silesia with an army of 30,000 men. His first victory was gained at Mollwitz on April 10, 1741. A second Prussian victory was gained at Chotusitz, near Czeslau, on May 17, 1742, by which time Frederick was master of all the fortified places of Silesia. Maria Theresa, in the heat of her struggle with France and the elector of Bavaria, now Charles VII., and pressed by England to rid herself of Frederick, concluded with him, on June 11, 1742, the peace of Breslau, conceding to Prussia Upper and Lower Silesia as far as the Oppa, together with the county of Glatz. Frederick made good use of the next two years, fortifying his new territory, and repairing the evils inflicted upon it by the war. By the death of the prince of East Friesland without heirs, he also gained possession of that country. He knew well that Maria Theresa would not, if she could help it, allow him to remain in Silesia; accordingly, in 1744, alarmed by her victories, he arrived at a secret understanding with France, and pledged himself, with Hesse-Cassel and the palatinate, to maintain the imperial rights of Charles VII., and to defend his hereditary Bavarian lands. Frederick began the second Silesian war by entering Bohemia in August, 1744, and taking Prague. By this brilliant but rash venture he put himself in great danger, and soon had to retreat; but in 1745 he gained the battles of Hohenfriedberg, Sorr, and Hennersdorf; and Leopold of Dessau ("Der alte Dessauer") won for him the victory of Kesselsdorf in Saxony. The latter victory was decisive, and the peace of Dresden (December 25, 1745) assured to Frederick a second time the possession of Silesia.

Frederick had thus, at the age of thirty-three, raised himself to a great position in Europe, and henceforth he was the most conspicuous sovereign of his time.

Maria Theresa had never given up hope that she would recover Silesia; and as all the neighboring sovereigns were bitterly jealous of Frederick, and somewhat afraid of him, she had no difficulty in inducing several of them to form a scheme for his ruin. Russia and Saxony entered into it heartily; and France, laying aside her ancient enmity toward Austria, joined the empress against the common object of dislike. Frederick, meanwhile, had turned toward England, which saw in him a possible ally of great importance against the French. A convention between Prussia and Great Britain was signed in January, 1756, and it proved of incalculable value to both countries, leading, as it did, to a close alliance during the administration of Pitt. Through the treachery of a clerk in the Saxon foreign office, Frederick was made aware of the future which was being prepared for him. Seeing the importance of taking the initiative, and, if possible, of securing Saxony, he suddenly, on August 24, 1756, crossed the frontier of that country, and shut in the Saxon army between Pirna and Königstein, ultimately compelling it, after a victory gained over the Austrians at Lowositz, to surrender. Thus began the Seven Years' War, in



which, supported by England, Brunswick, and Hesse-Cassel, he had for a long time to oppose Austria, France, Russia, Saxony, and Sweden.

In 1757, after defeating the Austrians at Prague, he was himself defeated by them at Kolin; and by the shameful convention of Closter-Seven, he was freely exposed to the attack of the French. In November, 1757, however, when Europe looked upon him as ruined, he rid himself of the French by his splendid victory over them at Rossbach, and in about a month afterward, by the still more splendid victory at Leuthen, he drove the Austrians from Silesia. From this time the French were kept well employed in the west by Prince Ferdinand of Brunswick, who defeated them at Crefeld in 1758, and at Minden, in 1759. In the former year Frederick triumphed, at a heavy cost, over the Russians at Zorndorf; and although, through lack of his usual foresight, he lost the battle of Hochkirchen, he prevented the Austrians from deriving any real advantage from their triumph, Silesia still remaining in his hands at the end of the year. The battle of Kunersdorf, fought on August 12, 1759, was the most disastrous to him in the course of the war. He had here to contend both with the Russians and the Austrians; and although at first he had some success, his army was in the end completely broken. But he soon recovered from his despair, and in 1760 gained the important victories of Liegnitz and Torgau. He had now, however, to act on the defensive, and, fortunately for him, the Russians, on the death of the czarina Elizabeth, not only withdrew in 1762 from the compact against him, but for a time became his allies. On October 29th of that year he gained his last victory over the Austrians at Freiberg. Europe was by that time sick of war, every power being more or less exhausted. The result was that, on February 15, 1763, a few days after the conclusion of the peace of Paris, the treaty of Hubertusburg was signed, Austria confirming Prussia in the possession of Silesia.

Frederick's first care after the war was, as far as possible, to enable the country to recover from the terrific blows by which it had almost been destroyed; and he was never, either before or after, seen to better advantage than in the measures he adopted for this end. Although his resources had been so completely drained that he had been forced to melt the silver in his palaces and to debase the coinage, his energy soon brought back the national prosperity.

There was nothing about which Frederick took so much trouble as the proper administration of justice. Soon after he came to the throne Frederick began to make preparations for a new code. In the year 1749-51 his grand-chancellor, Von Cocceji, a man of wide knowledge and solid judgment, finished "The Project of the *Corporis Juris Fridericiani*," which was afterward made the basis of a legal system drawn up by the grand-chancellor Von Cramer—a system that came into operation in 1794 under Frederick's successor.

Looking ahead after the Seven Years' War, Frederick saw no means of securing himself so effectually as by cultivating the good will of Russia. In 1764 he accordingly concluded a treaty of alliance with the empress Catherine for eight years. Six years afterward, unfortunately for his fame, he joined in the first partition of Poland, by which he received Polish Prussia, without Dantzic and Thorn, and Great Poland as far as the Netzeffluss. Prussia was then for the first time made continuous with Brandenburg and Pomerania. Frederick would have run great risks had he refused to take part in this arrangement; but it was none the less a shameful violation of international law, the full penalty for which has perhaps not even yet been paid.

The emperor Joseph II., being of an ardent and impulsive nature, greatly admired Frederick, and visited him at Neisse, in Silesia, in 1769, a visit which Frederick returned, in Moravia, in the following year. The young emperor was frank and cordial; Frederick was more cautious, for he detected under the respectful manner of Joseph a keen ambition that might one day become dangerous to Prussia. Frederick never abandoned his jealousy of Austria, whose ambition he regarded as the chief danger against which Europe had to guard. He seems to have had no suspicion that evil days were coming in France. It was Austria which had given trouble in his time; and if her pride were curbed, he fancied that Prussia at least would be safe. Hence one of the last important acts of his life was to form, in 1785, a league of princes (the "Fürstenbund") for the defense of the imperial constitution, believed to be imperiled by Joseph's restless activity. The league came to an end after Frederick's death; but it is of considerable historical interest, as the first open attempt of Prussia to take the lead in Germany.

Frederick's chief trust was always in his treasury and his army. By continual economy he left in the former the immense sum of 70,000,000 thalers; the latter, at the time of his death, numbered 200,000 men, disciplined with all the strictness to which he had throughout life accustomed his troops. He died at Sanssouci August 17, 1786; his death being hastened by exposure to a storm of rain, stoically borne, during a military review. He passed away on the eve of tremendous events, which for a time obscured his fame; but now that he can be impartially estimated, he is seen to have been in many respects one of the greatest figures in modern history.

FREDERICK WILLIAM II., king of Prussia, was the nephew of Frederick the Great. His father, Augustus William, the second son of Frederick William I., having died in 1757, Frederick William was nominated by the king successor to the throne. The size and population of Prussia was largely increased under Frederick William II.; but, generally, he attained his aims by means which the more intelligent class of his subjects did not approve, and by his vacillating policy he greatly lowered the state in the esteem of the world. He not only exhausted the resources accumulated by Frederick the Great, but imposed on the country a burden of debt; and he excited much ill-feeling by introducing a severe censorship of the press, and by subjecting the clergy to laws conceived in a spirit of the narrowest orthodoxy. He died November 16, 1797. His first wife having been divorced in 1769, he married the Princess Louise of Hesse-Darmstadt, by whom he had five sons.

FREDERICK WILLIAM III., king of Prussia, was the eldest son of Frederick William II., and was born on August 3, 1770. In 1793 he married the Princess Louise, daughter of the duke of Mecklenburg-Strelitz. He was rather dull and slow; but he had a sincere desire for the welfare of his people; was capable in emergencies of undertaking a great enterprise, and allowed himself to be freely influenced by the loftier impulses of his wife. When he succeeded to the throne he at once removed the principal grievances due to the weakness of his father, and called to his aid capable and honest ministers. By the treaty of Lunéville, in 1801, he was obliged to concede to Napoleon his territory on the left bank of the Rhine; but he received some compensations. In 1805 he was brought for a short time into conflict with England for accepting Hanover from Napoleon in return for certain concessions. Up to this time he had remained at peace with France; but the formation of the Confederation of the Rhine in 1806



filled him with alarm and indignation, and, giving way to a sudden impulse, he demanded that all French troops should forthwith quit German soil. The result was the battles of Jena and Auerstädt, followed by those of Eylau and Friedland, and on July 9, 1807, he had to sign the treaty of Tilsit, which deprived him of half his kingdom. The king was forced in 1812 to conclude an alliance with Napoleon, and to aid him with an auxiliary corps in his expedition to Russia; but seeing the disastrous retreat of the French from Moscow, Frederick William appealed to the country to undertake a war of liberation. In due time the appeal was followed by the battle of Leipsic and the battle of Waterloo. After the conclusion of peace he labored sincerely, with the aid of competent ministers, to undo many of the evils caused by the confusion of the previous years; but he forgot that in his time of need he had promised to set up a constitutional system of government. He only instituted (1817) provincial estates; and after the July Revolution he proved himself an uncompromising and bitter opponent of liberal ideas. He died on June 7, 1840.

FREDERICK WILLIAM IV., king of Prussia, the son of Frederick William III., was born on October 15, 1795. He married Princess Elizabeth of Bavaria in 1823, but had no children. In 1847 he assembled at Berlin a united diet, made up of representatives of the provincial diets established by his father, and created intense discontent by proclaiming that he would not allow a constitution to stand between him and his people. The revolutionary movement of 1848, took him wholly by surprise, and he was so alarmed that he not only promised to institute parliamentary government, but placed himself at the head of the agitation for the unity of Germany. When, however, in 1849 the national assembly at Frankfort offered him the title of emperor, he declined it. He formed an alliance with Hanover and Saxony for the purpose of creating a new German constitution, and summoned a national parliament at Erfurt. Austria insisted on the old Frankfort diet being reestablished, and for a time war appeared to be imminent. Ultimately, by the treaty of Olmütz (1850) Austria prevailed. In 1850 the Prussian constitution was proclaimed, but it was interpreted in a narrow sense, and under the reactionary ministry of Manteuffel some of its most essential provisions were soon changed. On his way back from Vienna in the summer of 1857, he had a stroke of paralysis in Dresden; in October of the same year he had a second stroke in Berlin. From this time, with the exception of brief intervals, his mind was clouded, and the duties of government were undertaken by his brother William, who on October 7, 1858, was formally recognized as regent. The king spent the winter of 1858-59 in Rome, where his health occasionally improved, but when he returned to Berlin in November, 1860, his end was seen to be near, and he died at Sanssouci on the night of January 2, 1861.

FREDERICK I., elector and duke of Saxony, surnamed the Pugnacious, eldest son of Landgraf Frederick the Severe of Thuringia and of Catherine countess of Henneberg, was born at Altenburg, March 29, 1369. He died at Altenburg, January 4, 1428. The university of Leipsic was founded by Frederick in 1409.

FREDERICK II., elector and duke of Saxony, surnamed the Meek, son of the former and of Catherine of Brunswick, succeeded his father in 1428.

FREDERICK III., elector and duke of Saxony, surnamed the Wise, grandson of the preceding and son of Duke Ernst, was born at Torgau 1463. On the death of his father in 1486, he succeeded him in the sole government of Saxony, but divided the other possessions of

the Ernestine line with his brother John the Constant. Frederick founded the university of Wittenberg in 1502 and appointed Melancthon and Luther to two of its chairs. He was three times imperial vicar, and on the death of Maximilian I. he was offered the imperial throne, but declined it, and, in accordance with his recommendation, it was bestowed on Charles V. Frederick died at Lochau May 5, 1525.

FREDERICK III., King of Prussia (Frederick I. of Germany), formerly known as "Unser Fritz," the Crown Prince of Prussia, was the son of Emperor William I. of Germany, and was born at Potsdam, October 13, 1831. He was an interested witness of the scenes of the revolution of 1848, and it is more than probable that to the influence exerted by these scenes was due his liberal spirit in after years. In 1861 his father ascended the throne of Prussia as William I., and he was at that time a general in the army—having all through his life been the subject of thorough military training. He had previously married (in 1857) Princess Victoria Adelaide, the eldest daughter of Queen Victoria of England. The issue of this marriage were seven children, the eldest being the present Emperor William III., who was born in 1859. Frederick took part in the war of 1866 between Denmark and the coalition of Prussia and Austria, and also commanded one of the armies of invasion in the subsequent war between Austria and Prussia, and took a leading part in the decisive battle of Sadowa. During the Franco-Prussian war of 1870 he commanded the army corps which invaded France through the territories of Alsace and Lorraine, and for his distinguished services he was made field marshal-général, the highest military dignity known to the Prussian service. After the war was over he returned to Berlin and was engaged in civil duties, assisting his father in the administration of the affairs of the empire (of which he had become, by the crowning of his father as emperor, the prince imperial), and at this period of his life spent considerable time in foreign travel. He was not in sympathy with the extreme policy of Bismarck, but their amicable relations suffered no serious interruption. In his domestic relation he was plain, unostentatious; a good husband and a kind father; and although his entire life had been spent in the midst of soldiery and military surroundings, he was disinclined to war, and an ardent advocate of peace. He was universally beloved for his sterling qualities, and during his last illness was the object of more sympathy and tender solicitude than had ever before been the lot of any sovereign to receive. In March, 1888, on the death of his father, the emperor William I., he ascended the imperial throne, and his brief reign of three months has a melancholy interest, on account of his sufferings, borne with such heroic fortitude. He was never formally crowned, on account of his physical inability to undergo the fatigue incident to the ceremony, and he died at Berlin June 15, 1888, surrounded by his family and the officials of his household. [For the incidents of his reign, and an account of his death, see the article GERMANY.]

FREDERICK AUGUSTUS I., elector of Saxony. See AUGUSTUS II., of Poland.

FREDERICK AUGUSTUS II., elector of Saxony. See AUGUSTUS III., of Poland.

FREDERICK AUGUSTUS I., king of Saxony, son of Elector Frederick Christian, was born at Dresden, December 23, 1750, succeeded his father, under the guardianship of Prince Xavier, in 1763, and was declared of age in 1768. In the following year he married Princess Maria-Amelia of Deux-Ponts. In 1791 he declined the crown of Poland. He refused to join the league against France in 1792 but when war was de-



clared his duty to the German empire necessitated his taking part in it. He maintained his neutrality during the war between France and Austria in 1805, but in the following year he joined Prussia against France. After the disastrous battle of Jena he concluded a treaty of peace with Napoleon at Posen, November 11, 1806, and, assuming the title of king, he joined the Rhenish confederation. Having taken part in the subsequent wars of Napoleon, he fell into the hands of the allies after the entry into Leipsic, October 19, 1813; and although he regained his freedom after the congress of Vienna, he was compelled to give the province of Wittenberg to Prussia. His reign throughout was characterized by justice, probity, moderation, and prudence. He died May 5, 1827.

FREDERICK AUGUSTUS II., king of Saxony, eldest son of Prince Maximilian and of Caroline-Maria Theresa of Parma, was born May 18, 1797. His death occurred accidentally through the upsetting of his carriage between Imst and Wenss, in Tyrol, August 9, 1854. Frederick devoted his leisure hours chiefly to the study of botany.

FREDERICK I., elector palatine, surnamed the Victorious, second son of Elector Louis III., was born in 1425, and died in 1476.

FREDERICK II., elector palatine, surnamed the Wise, fourth son of Philip the Noble-minded, was born in 1482, and died in 1556.

FREDERICK III., elector palatine, surnamed the Pious, eldest son of John II., palatine of Simmern, was born in 1515, succeeded his father in 1556, and became elector palatine on the death of Otto Henry in 1559. He died October 26, 1576.

FREDERICK IV., elector palatine, surnamed the Upright, son of Elector Louis VI. and of Elizabeth of Hesse, was born in 1574, and succeeded his father under the guardianship of his uncle John Casimir in 1583, and after the death of the latter in 1592 ruled as independent governor. His reign is chiefly of importance for the steadfast and firm support he rendered to the Protestant cause. Under his auspices the Protestant union of Germany was formed in 1601. He died in 1610.

FREDERICK V., elector palatine and king of Bohemia, son of Frederick IV. and of Louisa Julia, daughter of William of Orange, was born at Amberg in 1596, and succeeded his father in 1610. Frederick died at Mainz, November 19, 1632.

FREDERICKSBURG, a city of Spotsylvania county, Virginia, on the southwest side of the Rappahannock river, one hundred and ten miles above its mouth in Chesapeake Bay, and sixty-one miles north of Richmond. The river, which is tidal up to this point, is here closed by a dam 900 feet long. It supplies motive-power for flour and other mills, and affords facilities for transportation of grain, marble and freestone. Near the city is an unfinished monument, begun in 1833, over the grave of the mother of Washington. Population (1890), 4,517.

FREDERICKSBURG, BATTLE OF. After the battle of Antietam, the sentiment of opposition in the North to General McClellan, who had failed to follow up the advantages (barren though they were) resulting from that battle, culminated in his dismissal, and, shortly subsequent, supersession by Gen. A. E. Burnside, as commander of the army of the Potomac. Although General Burnside had announced his incapability for the command of so large an army, he was forced to accept, and December, 1862, found him encamped on the north bank of the Rappahannock river, with his headquarters at the Lacy house in Stafford county.

Lee's army lay on the south bank some distance from the town of Fredericksburg, but on the first intimation that Burnside was about to attempt to cross the river he promptly advanced to the town and massed his army on the hills which surround the town in a crescent shape—the convexity, pointing to the town, being occupied by the center of Lee's army, while the left, which receded to the southwest, was held by Longstreet, Jackson holding the right, with Stuart on his extreme right guarding Hamilton's crossing—a point on the range surrounding the town, which could only be approached from the river by crossing the R. F. and P. railroad and the narrow-gauge railroad cut—these two features of the surface of the country adding to the natural strength of the position of the Confederate army on the right. General Burnside determined to cross the river and assault Lee's army despite the fact that valuable time had been lost by him, and Lee had had time to render his position impregnable. His division commanders and subordinates generally, it is claimed, tried to dissuade him from making so rash an attempt, but all to no purpose. On November 7th he commenced his attempts to lay a pontoon at the west end of the town, over the river, at a point between the cotton mills, on the south bank of the river, and the Falmouth Heights, on the north. Sharpshooters in the town, however, prevented the accomplishment of this scheme, thus giving Lee additional time to perfect his arrangements, and it was not until a force had been sent across the river (at the suggestion of General Hunt), which cleared the town of Confederates, that the laying of the pontoons was successfully accomplished. In the meantime the town had been severely bombarded by the Federal batteries on Falmouth Heights, but all to no avail, so far as dislodging the Southern sharpshooters was concerned. Another bridge was simultaneously thrown over the river at Hamilton's crossing to the east of the town, and then the assaulting army—divided into three divisions under the command of Sumner, Hooker and Franklin, crossed the river and advanced on Lee's position. The crossing occupied two days, and, on December 13, 1862, under the cover of a dense cloud of fog and drizzle, the battle was begun.

The town of Fredericksburg lies, as has been before incidentally mentioned, at the foot of a low crescent-shaped ridge which rises from the rear or southern portion of the corporate limits with some abruptness, and then stretches out into a broad table-land, extending far to the south and west. On the extreme left of Lee's army lay the Rappahannock, while on the extreme right was Hazel "run"—a small creek or "branch," as it is called in the southern country. Immediately in front of Lee's center lay the town, between which two points was a canal full of water, and south of the canal was a roadway winding along the side of the hill, and along the side of this road ran a stone wall or fence, behind which was posted a strong body of Confederates. To the rear of this wall and on the top of the hill, at this point called Marye's Heights, was massed a heavy force of Confederate artillery.

Sumner and Hooker led their divisions over the pontoons on the Confederate left, while Franklin, on whom devolved the opening of the battle, crossed on the lower or eastern pontoon, and began the attack by assaulting Jackson, his men having to charge up the slope and across the railroad tracks, in the face of a murderous fire. They made a gallant fight, but flesh and blood could not stand the terrific storm they encountered. The artillery of the Southern army was so stationed that it could fire over the heads of its own infantry with terrible effect, while the Union army was almost entirely deprived of the use of its artillery.



the danger to their own men by its use being far greater than that to which the enemy was exposed from their fire. At the same time the Confederate infantry, being in a position almost impregnable, had no hard task to repel the assaults which were repeatedly made by the Union forces. Meade led the charge of Franklin's division, and although he put forth almost superhuman efforts, and received reinforcements, it was of no avail; nothing could be accomplished, and after having thousands of his men slaughtered, he withdrew from the fight, having accomplished nothing, and lost the flower of the Federal army. On the center the slaughter of the Union troops was terrible. Sumner's division deployed through and to the west of the town, and advanced against the position held by Pickett's men. In their course they had to charge over the canal and then up a long incline to the top of the hill. About half way up the hill they encountered the fire from the troops behind the wall mentioned before. Division after division was thrown against this point, and men were mown down like grass before the sickle. One brigade—the "Irish" brigade of Meagher—in particular suffered severely. These brave men were again and again ordered to charge and dislodge the Confederates behind the stone wall, the artillery in the meantime playing on them in one continuous fire. The task was hopeless, and after three-fourths of the troops so engaged had been killed, the order was given to desist. When the day was over it was found that the Federals had lost over 14,000 men, while the Confederate loss had been only about 5,000.

On the next day Burnside proposed to renew the assault, and it was only at the earnest solicitations of his subordinates that he desisted. Shortly after this battle he was, at the unanimous request of his generals of division, removed from command, and General Hooker was made his successor. Everything taken into consideration, this battle is one of the most remarkable fought during the entire course of the war. It has long been a bone of contention among the military authorities as to the circumstances which led Burnside to determine to give Lee battle under these conditions. He certainly could not have hoped to carry a position so strong as was that of the Confederate commander, and the whole affair is enshrouded with an air of mystery.

A second battle was fought at Fredericksburg a few months later during the CHANCELLORSVILLE CAMPAIGN (*q.v.*), General Early being attacked here by a Federal force under General Sedgwick, and forced to retire, but again occupying the same position after Sedgwick had gone on his way to effect a junction with Hooker at Chancellorsville.

Immediately after Burnside's defeat he recrossed the river, and after his removal the army, under Hooker, lay at Falmouth and in the adjoining country the remainder of the winter, no military operations of importance taking place until May, when Hooker attempted to turn Lee's flank, and fought the battle of Chancellorsville as is described under that head.

In 1864, during the Wilderness Campaign under General Grant, the town was repeatedly the scene of military operations. Indeed, it may be said that there is not a foot of the soil in and around the town, but has drunk the soldier's blood. In this vicinity the three greatest and bloodiest battles of the war were fought, and it is said that more than 100,000 men were killed in and around the town. There is now a large Federal cemetery on the top of Marye's Heights, upon the spot where the Confederate artillery was massed, while off to the left, at the foot of the slope, in a large grave-yard, sleep 15,000 Confederates, who fell here. There are other cemeteries close by, all filled with the remains of those who

fell in the battles in and around the town.

FREDERICKSHAUD, or FREDERICKSHALL, a maritime town of Norway, stift of Christiania, at the junction of the Iddefjord with the Tistedals, fifty-seven miles south-southeast of Christiania.

FREDERICKSTAD, a fortified town of Norway, stift of Christiania, is situated at the mouth of the Glommen, forty-eight miles southeast of Christiania.

FREDERICTON, the capital of York county and of the Province of New Brunswick, is situated upon the right bank of the St. John's river, eighty-five miles from its mouth, and is a well built and thriving city, with a population (1890) of 7,500. Among the public buildings the chief are the new Parliament buildings, the county court-house, the provincial normal school, the legislative library building, and the government house, the residence of the lieutenant-governor. Fredericton has several railroads and ships large quantities of lumber by river. It has four banks, twelve churches, a convent, a university, a number of schools, and five newspapers. The city has a good water supply, and is lighted by gas and electricity. Of manufactures, the chief are foundries, carriage and sleigh factories, tanneries, and saw mills.

FREE CHURCH OF SCOTLAND, THE, is the name of a well known ecclesiastical organization which includes a considerable proportion of the inhabitants of Scotland. In one sense the Free Church dates its existence from the Disruption of 1843, in another it claims to be the rightful representative of the National Church of Scotland as it was reformed in 1560. There were three periods of reformation. The first reformation extended from 1560, when the church freely held her first General Assembly, and of her own authority acted on the *First Book of Discipline*, to 1592, when her Presbyterian order was finally and fully ratified by the parliament. The second period began in 1638, when, after twenty years of suspended animation, the assembly once more shook off Episcopacy, and terminated in 1649, when the parliament of Scotland confirmed the church in her liberties in a larger and ampler sense than before. The third period began in 1834, when the Assembly made use of what the church believed to be her rights in passing the Veto and Chapel Acts. It culminated in the Disruption of 1843.

The final struggle may be said to have begun with the passing in 1834 of the "Veto" Act, by which it was declared to be a fundamental law of the church that no pastor should be intruded on a congregation contrary to the will of the people, and by which it was provided that the simple dissent of a majority of heads of families in a parish should be enough to warrant a presbytery in rejecting a presentee. The question of the legality of this measure soon came to be tried in the civil courts; and it was ultimately answered in a sense unfavorable to the church by the decision (1838) of the Court of Session in the Auchterarder case, to the effect that a presbytery had no right to reject a presentee simply because the parishioners protested against his settlement, but was bound to disregard the veto. This decision elicited from the Assembly of that year a new declaration of the doctrine of the spiritual independence of the church. In the circumstances it was resolved by the Assembly of 1842 to transmit to the queen, by the hands of the lord high commissioner, a "claim, declaration and protest," complaining of the encroachments of the Court of Session, and also an address praying for the abolition of patronage. The home secretary's answer (received in January, 1843) gave no hope of redress. At the first session of the General Assembly in 1843 the entire



non-intrusion party withdrew to another place of meeting, where the first Assembly of the Free Church was constituted, with Dr. Thomas Chalmers as moderator. This Assembly sat from the 18th to the 30th of May, and transacted a large amount of important business. On Tuesday, the 23d, 396 ministers and professors publicly adhibited their names to the Act of Separation and Deed of Demission by which they renounced all claim to the benefices they had held in connection with the establishment, declaring them to be vacant, and consenting to their being dealt with as such. By this impressive proceeding, the signatories voluntarily surrendered an annual income amounting to fully £100,000.

The first care of the voluntarily disestablished church was to provide incomes for her clergy and places of worship for her people. Between November, 1842, and May, 1843, 647 associations had been formed; and at the first Assembly it was announced that upward of £17,000 had already been contributed. At the close of the first financial year (1843-44) it was reported that the fund had exceeded £61,000. It was participated in by 583 ministers; and 470 drew the full equal dividend of £105 (\$525). Each successive year showed a steady increase in the gross amount of the fund; but owing to an almost equally rapid increase of the number of new ministerial charges participating in its benefits, the stipend payable to each minister did not for many years reach the sum of £150 which had been aimed at as a minimum.

To provide for the erection of the buildings which, it was foreseen, would be necessary, a general building fund, in which all should share alike, was also organized, and local building funds were, as far as possible, established in each parish. At the end of four years considerably more than 700 churches had been provided.

During the winter session 1843-44 the divinity students who had joined the Free Church continued their studies under Doctor Chalmers and Doctor Welsh; and at the Assembly of 1844 arrangements were made for the erection of suitable buildings. The New College, Edinburgh, was built in 1847 at a cost of £46,506; and divinity halls have subsequently been set up also in Glasgow and Aberdeen.

**FREEHOLD**, in the English law of real property, is an estate in land, not being less than an estate for life. An estate for a term of years, no matter how long, was considered inferior in dignity to an estate for life, and unworthy of a freeman (see **ESTATE**).

**FREE IMPERIAL CITIES** is the ordinary English translation of *Freie Reichs-Städte*, a technical expression in German history. In Germany, as in other countries of Europe, a considerable number of towns succeeded, in the midst of the dynastic confusion of the Middle Ages, in maintaining or acquiring more or less complete independence of the state or sovereign within whose territory they were situated. This they effected partly by forming defensive leagues with each other, and partly by procuring, in return for service or money, privileges and protection from the successive occupants of the imperial throne. Of these free towns a certain proportion rose by commerce and industry to a position of great influence, and ultimately took rank along with kingdoms and principalities as integral members of the body politic of the empire. They first appear distinctly in this character in the reign of Henry VII. (1308-1313).

**FREEMASONRY** is the name given to that system of ritual and rules which Freemasons observe. It may also be applied to the masonic art, or the practice of masonic ritual and rule. The institution is not older than the beginning of the eighteenth century, but it has been lately said to include more than 10,000 lodges and

more than 1,000,000 members. The conception of Freemasonry implies cosmopolitan brotherhood, and was therefore impossible in the ancient world. If indeed the genuine legends of the craft were followed, its origin would be traced to the creation, the flood, or at least the building of Solomon's temple. Accordingly, one of the most popular and voluminous masonic writers of the nineteenth century, the Rev. George Oliver, informs the world that Moses was a grand master, Joshua his deputy, and Aholiah and Bezaleel grand wardens. The true historical precursors of the modern fraternity of Freemasons were the mediæval building corporations. Of these the most distinctive type is to be found in the stone masons of Germany. The *cementarii* or *liberi muratores* at first grouped themselves round the monasteries, especially of the Benedictine order. The abbots were in many cases the architects who employed the masons on ecclesiastical buildings and repairs. As architecture developed, and with its increasing wealth the church gradually undertook larger and nobler works, these societies of craftsmen also assumed a more definite and more durable form. The taste and science of Gothic architecture were to a large extent the possession of the *Bauhütten*, or wooden booths where the stone-cutters during the progress of the work kept their tools, worked, held their meetings, and probably also took their meals and slept. In the twelfth century there are distinct traces of a general association of *Bauhütten* throughout Germany, acknowledging one set of craft laws, one set of secret signs and ceremonies, and to a certain extent one central authority in the *Haupthütte* of Strasburg. Albertus Magnus (1205-1280) is supposed to have introduced many of the Jewish and Arabian symbols which were popular in the craft. The privileges which a *Bauhütte* was able to give to its masters, parlierer (speakers), and journeymen, were chiefly "a share in the administration of justice, in the election of officers, in the banquets, and in works of charity." The initiation is said to be copied from a Benedictine consecration. Instruction was given to all apprentices in both architecture and its allegory. When he had served his time and finished his "Wanderjahre," every man was entitled, if of good character, to receive the *Wortzeichen* or *der Gruss*. He took the oath of secrecy on the Bible, the compass, and the square, and drank the *Willkommen*. The three great lights, the hammer or gavel, the gold, azure, and white colors, the sacred numbers 3, 5, 7 and 9, and the interlaced cords, all had their traditional meaning. The obligation to secrecy, however, probably applied to the apprentice even before initiation. The atmosphere of these societies seems, even at an early date to have been favorable to liberty of thought and religious toleration. Hence they were prohibited by the council of Avignon, in 1326. The authority of the *Haupthütte* was recognized at the great assemblies of Ratisbon and Strasburg, in 1459, the statutes of which received imperial confirmation. It was legally destroyed by an edict of 1731, long before which time its practical vitality had ceased. England imported much of her lodge organization and learning from Germany. The York charter, on which she based her claim to a native system in the time of Athelstan, is a much later document. This charter contains the famous legend of the craft which derives the seven liberal sciences (masonry being a part of geometry) from the family of Lamech. This science, preserved on a stone pillar from the flood, was taught by Euclid to the Egyptians, and carried by Israel to the building of the temple. Maymus Græcus brought it to Charles Martel and to England. The first instance of a gentleman or amateur being "accepted" is



that of the antiquary Elias Ashmole (afterward Windsor Herald under Charles II.) who, along with Colonel Mainwaring, was entered at Warrington in 1646. The causes which led to the introduction of a new class of members, and gradually converted operative into speculative masonry, are well stated by Findel, the learned editor of the German masonic journal *Die Bauhütte*. whose *History of Freemasonry* (translated into English in 1869) is by far the most scientific and complete work upon the subject. The growing spirit of the Reformation in religion gave men a freedom of speech which superseded the marks and caricatures in which the old masons exposed the vices of the church. Toleration was soon a political fact. Science, too, took a new departure from the time of Bacon. The interrogation of nature was preferred to legend and allegory. At the same time a perfectly distinct current of ideas was originated by the Arabian mysticism of Paracelsus and Rosenkreuz, which, after being popularized on the Continent by one of its most decided opponents, Valentine Andreae, was preached to the people of England by Robert Fludd, in his *Tractatus Theologico-Philosophicus*.

*England.*—Modern or speculative masonry may be said to have begun in London on June 24, 1717, "the high noon of the year, the day of light and of roses," when the four London lodges, having erected themselves into a grand lodge, named their first grand master. The leading spirits in this revival were Desaguliers, the well-known popularizer of natural science, and James Anderson, a Scotch Presbyterian minister, who compiled the *Book of Constitutions*, containing the ancient regulations and charges of the craft. From this time new lodges could be formed only by warrant from the grand lodge, but they were empowered to create masters and fellow crafts. In 1721 the duke of Montagu was elected grand warden. He was the first noble who obtained that office. In the strange society of Gormogones, subject to the "sub-œcumenical volgi" at Rome, it is supposed that the Jesuits made a final effort to secure English Freemasonry as a channel for their political influence. At this time, also, the committee of charity was formed, which has since raised and expended very large sums for the relief of distressed brethren, and built the boys' and girls' masonic schools at Battersea Rise and Tottenham. Provincial grand masters were appointed, and charters granted to many foreign lodges. In the latter part of the eighteenth century the ancient York Lodge, backed by several old masons who had been indulging in irregular initiations, put forward a rival claim to be a grand lodge or supreme authority. This claim was rested on the fable of an assembly at York in the year 926. On the orthodox or London side appeared the well-known *Illustrations of Masonry*, by Preston, the pupil of Ruddiman. The schismatics introduced the red color of the royal arch degree, which they represented as something more exalted than the blue degrees of St. John. It belongs to the order of Templars, the legend referring to the second building of the temple. Another branch of Templarism, the grand chapter of Harodim, was founded in London in 1787. The Act of 1799 directed against seditious societies, however, makes an exception in favor of the masonic lodges, which, according to the Act, meet chiefly for benevolent purposes. In 1813 a union was at last brought about by the dukes of Sussex, Kent and Athole between the rival grand lodges of London and York, henceforth known as the United Grand Lodge of England. This patronage of aristocratic blood gave an impetus to Freemasonry, and in 1832 Mr. Crucefix, the editor of the *Freemason's Quarterly Review*, succeeded in founding the Freemason's Asylum. The brotherhood showed their good sense in deciding about this

time that Jews might become members of the craft. They also built a hall, established their archæological institute and "The London Literary Union," and started the *Freemason's Magazine* and the *Freemason*.

*America.*—The first attempt to introduce freemasonry into America was made in 1730, when a provincial grand master was appointed in New Jersey; but we have no record that he established any lodge under the authority of his deputation. Three years later, however, a lodge was opened at Boston, which was speedily followed by the organization of other lodges in the different colonies. Up to the War of Independence the lodges of America derived their warrants of authority from the grand lodge of England or Scotland, but after the struggle was over and American independence assured, they availed themselves of the privileges belonging to bodies of freemasonry in all independent countries, and organized grand lodges in their respective States. In no other country has freemasonry developed itself faster and showed greater vitality than in the United States; and, though it had to meet at times severe opposition, such as commenced in 1829, by the organization of an anti-masonic party, it has increased numerically with such steady progress, that at the present day the number of its members amounts to over half a million, belonging to several thousand lodges. The privileges of masonry in America have been denied to persons of African descent by the American grand lodges. Although since the war lodges of men of African descent have been established, which claim the sanction of the grand lodge of England, yet they are regarded as "clandestine" or irregular. The basis of this exclusion is the fact that a mason must be born of a free woman, and the negroes, having been in domestic bondage, are ineligible. In May, 1873, a lodge was established by Americans in the city of Jerusalem; and in the preceding year the grand lodge of Italy was opened in Rome itself. In Europe the organization has been frequently used for political purposes, especially as a cloak for conspirators against the governments. By such acts, however, the constitution of freemasonry is violated which forbids all political partisan or sectarian discussions in the lodges. The primary organization of the masonic fraternity is into lodges, which in the first degree must each be composed of at least seven members in good standing. In the other degrees the number constituting a lodge varies. There are several degrees in masonry, the first and lowest of which is that of entered apprentice; the second of fellow-craft; the third of master mason. The officers of a lodge in the United States are worshipful master, senior warden, junior warden, treasurer, secretary, senior deacon, junior deacon, tiler and chaplain. There are also two stewards. Essential to every lodge organization are the master, the wardens, and the tiler, whose latter duty it is to keep the door and guard against intrusion. The officers are elected annually by ballot. In each State of the Union there is a grand lodge composed of the representatives of the subordinate lodges, over which it exercises a certain jurisdiction. Its officers are styled grand and deputy grand masters, grand wardens, grand treasurer, grand secretary, grand chaplain, grand deacons, grand marshal, grand pursuivant, grand sword-bearer, grand stewards and grand tiler. There are also still higher degree of masonry, those of the mark master, the past-master, the most excellent master, and the royal arch, the members of which are termed royal-arch masons, and form royal-arch chapters, with a special exception in the case of the past-master's degree, which degree every worshipful master of a third degree lodge must take before he can preside in his lodge. The degree, while it is conferred in a chapter of past-masters.



is honorary, and does not entitle the recipient to enter a mark-master's lodge (which is a lower degree in regular order). Beyond this there is still a long series of degrees bearing various titles.

**FREEPORT**, a city of Illinois, United States, the capital of Stephenson county, is situated on the Peca-tonica river, 110 miles west-northwest of Chicago. It is a rapidly increasing town, and possesses woolen and carpet manufactories, a foundry, a tannery, a beet-root sugar factory, and various kinds of agricultural implement factories. The principal buildings are the court house and the Presbyterian college, which was instituted in 1872. Population (1890), 10,189.

**FREETOWN**, a town of West Africa, capital of the British colony of Sierra Leone, stands on the south side of the estuary of the Sierra Leone river, about five miles from the cape of that name. The population is about 18,000.

**FREE TRADE.** This expression has been appropriated, in a somewhat technical manner, to denote an unimpeded intercourse between such manufacturing and commercial communities as having reciprocal interests, are under separate governments, and there-upon have separate financial systems. Thus the term is not applied to the facilities which town and country, laborer and capitalist, have obtained for reciprocal exchange, though these facilities have been acquired only in comparatively recent times.

Between nations, free trade represents the well-known principle of the division of employments. The advantages which result from the natural or spontaneous division of employments, and the loss which ensues from a forced division of employments, are the commonplaces of economists. But the fact that exactly the same principle rules the distribution of production over such parts of the world as are occupied by industrial agents is not so frequently insisted on. That there are several commodities which a country cannot produce at all, or can only produce under circumstances so disadvantageous as to involve disproportionate expense or loss, is admitted by every government, however anxious it may be to develop native industry by protective regulations. No European government, however imperfectly civilized, would attempt to direct its home industries into the production of tea, coffee, and chocolate, or to domesticate elephants for the sake of their ivory, or to breed ostriches for the sake of their plumes, or to maintain a race of wild hogs in order to obtain a due supply of bristles from native sources. But there are in most countries a number of industries the continuity of which governments have attempted, and still attempt, to promote, by hindering the free entrance of foreign-made articles of the same kind. It will be found that, historically, this practice has had its origin in what is now understood to be a delusion as to the true functions of the currency.

The control of production and trade in modern Europe is historically due to the development of what Adam Smith called the mercantile system, *i. e.*, the effort of government to secure as far as possible the largest possible amount of specie within the country whose affairs it administered. It is easy to discover the origin of this policy. To a government which spends, but does not produce, the possession of treasure is of the greatest utility and service. To an individual who produces and trades, still more to one who trades only, treasure is, as a rule, the least valuable instrument of traffic, as it is an article from which, as it is affected by the least possible variation in value, the least amount of profit can be anticipated by those who deal in it as an article of trade. A trader in the

Middle Ages would have readily accepted the doctrine that money was wealth as far as regarded everyone but himself; as far as he was concerned, he wished to get rid of his money as soon as he could, in exchange for goods, on which he might secure his profits. The doctrine that the machinery of international trade supplied the process by which the precious metals were distributed, and that therefore, if trade were to exist, the attempts of government to restrain the exportation of money were mischievous or nugatory, was argued as early as the middle of the fourteenth century by Sanuto the Venetian, and by Oresme the bishop of Lisieux, in language as precise as any used by Turgot or Adam Smith. The reasonings, however, by which protective theories were upheld, the mean and malignant arguments of restraint, as Adam Smith calls them, were always strengthened in England up to thirty years ago, by suggesting the hideous consequences which would come on the nation from a drain of gold. Protection had its origin in the reputed duty of government toward the currency. Once established it created artificial interests whose existence was a loss to the whole community, but whose maintenance seemed to be the satisfaction of a contract entered into between the government and the industry which the government had called into being or had stimulated.

It will be clear that if any particular industry is of such a character as to be very conveniently carried out by the inhabitants of a particular community or district, if the producer fears no rival in the home market, and, still more, if he dreads no competition in a foreign market, any protection accorded to his industry must be wholly superfluous. He might even contemplate an export duty with equanimity, though of course an export duty would be destructive of his foreign market if he had real rivals, and he would generally find that such a duty would not only limit the consumption of his product, but would call a rivalry into existence. It is equally clear that if a protective duty were imposed on the importation of foreign commodities into a country which has already a marked superiority over other countries in these commodities, the regulation would have no effect in increasing either the profits of the producer or the cost of the article to the consumer,—that, in short, the enactment would be absolutely nugatory. It will be also plain that, in every country, there are certain commodities which are effectually shielded from foreign rivalry by the cost of carriage, and that such commodities possess the superiority which other products enjoy from the peculiar facilities which a particular country has in manufacturing them.

The positions stated above receive a significant but complete illustration from the economical history of England. A century ago the English landowners were free traders, the English merchants protectionists. Adam Smith rested all his hopes of a better system on the former class, but despaired of any co-operation from the latter. Twenty years after the *Wealth of Nations* was published, the mercantile and manufacturing classes, with few exceptions, were free traders; the landowners, with few exceptions, were protectionists. The explanation of the change in sentiment is to be found in the change of interests. Up to the middle of the eighteenth century England exported considerable quantities of agricultural produce—sometimes naturally, at other times under the wholly indefensible stimulus of a bounty on exportation. Now it needs very little intelligence to discover that the profits of an exporter, or at any rate the extension of his trade, depend largely on the variety of imports which he can obtain in exchange for his



goods. A country which puts no hindrance on imports always deals to the greatest advantage, and the advantage decreases with restraint. If a country refused to admit any import but one, *i. e.*, money, it would sell its exports in the worst possible market, and for the least possible value, receiving in return an article which the machinery of its trade takes the most effectual possible means to depreciate.

It may be believed that, in England at least, the question of protection to manufactures is finally settled, though there are not wanting persons who advocate reciprocity, coördinate taxation on foreign products, retaliatory duties on reputed bounties, and the like. But the traditions of legislation are too firmly fixed, and the benefits of free trade experienced during the past thirty years are so generally admitted, that the advocacy of the exploded theory of protection is looked on as a harmless whim which has no chance of popularity. It is not perhaps equally clear that the English people are quite safe against the revival of protection to agriculture under the pretense of sanitary restraint, for that which is the inevitable result of protection to manufacture, the limit of voluntary consumption, is not so markedly developed from the protection which may be accorded to articles of necessary consumption.

When trade is restrained in those articles of foreign origin which may be produced, though under less advantageous circumstances, at home, and the product is an article in which the use may, to a limited extent only, be economized, the following results ensue:—Prices rise, and profits rise,—of course, at the expense of the consumer; wages, however, do not rise, for in so far as wages are determined by the competition of employers for services, the tendency is toward a reduction of wages, seeing that the use of the product is not increased but rather stinted. Now the extra profits which protection accords might be secured to those who are already employed in the particular industry thus favored only if the producers have a natural monopoly in the produce of their calling, as was practically the case with the English landowners during the existence of the corn laws, or if the law restrains other persons from competing against them, as was the case in England with Eastern produce during the continuance of the East India Company's chartered trade. If such an advantage be not accorded, capital makes its way to the favored industry; or, to be more accurate, an increasing number of employers compete for the exceptional profit. Such an operation may in some degree raise the rate of wages, though here again, unless the labor be protected by some arrangement, such as apprenticeship, or by the machinery of a strict trade union, the same cause which attracted the energies of the employer will rapidly, even more rapidly, supply what may be needed in the way of labor.

There is a well-known passage in Mr. Mill's political economy in which this author conceives it expedient that protection should be given to certain industries in new countries, provided that the country had good natural resources for the successful prosecution of such an industry, and the protection accorded be only temporary. But apart from the fact that new countries never possess a superfluity of capital and labor, and therefore are least of all well advised in directing these elements of wealth into channels where they would be less advantageously employed than they would be in others; apart from the considerations that all countries have a natural protection in the cost of carriage, and in the comparative ease with which they can interpret demand; and apart from the fact that good natural advantages for any particular

industry are sure to suggest that industry at the very earliest time at which it will be expedient to undertake it—the circumstances which invariably affect a protected industry render it impossible that Mr. Mill's rule of a temporary protection should be applicable. Who is to determine at what time the protection should be removed? Not the consumer, as represented in the legislature, for he would naturally object to the protection from the beginning, since the regulation inflicted a loss on him, at the very instant that it came into operation. Not the manufacturer, for until the time comes in which he dreads no rivalry, he believes that the regulation is the guarantee of his ordinary profit, and that its removal will expose him to certain loss. The probability that he may come to such a state as to render the protection manifestly superfluous depends on his making some great, sudden and lasting stride in the efficiency of the industry which he exercises.

It may be concluded then, that, while Mr. Mill has given a doubtful defense for the adoption of a temporary protection, his limits to the protection so accorded will be found to be practically nugatory, and that, in fact, the adoption of the system will confer the minimum of good, while the abolition or abandonment of it will inflict the maximum of injury. This result then—the creation of factitious industries, which cannot be assisted by the operations of government without loss to the consumer, but which cannot be abandoned by government without ruin, real or apparent, to the consumers—is substantially the apology and defense for the protective systems of Continental Europe. For there is nothing which characterizes modern systems of government more than the tenderness which all parties show toward imperiled interests. There is a growing disposition toward treating them as vested—that is, as equitably entitled to compensation if their continuity is disturbed or even threatened. Of course, there must be a limit to this consideration, for no government has yet ventured on admitting, however democratic may be its institutions, the vested interests of manual labor, or allowed that it should be compensated, if events required that a change be made in legislation which might interfere with the continuity of its wages. But if the project which is in favor with certain schools of socialism in France and Germany, that the state should assist labor (and of course, it could assist only special kinds of labor) with government subventions, the doctrine of vested interests would assuredly be applied to such assisted callings.

The great advantage which free trade has bestowed on English manufactures consists in the fact that it has enabled the producer to interpret accurately the cost of production, and therefore to discover the prospect which his industry has of a remunerative market. It is superfluous to protect an industry which is strong enough to assert itself in the rivalry of competition. It is similarly superfluous to protect an industry the products of which, by reason of their bulk and cheapness, are shielded from competition by the costs of carrying the same products from foreign parts, or even from remote districts within the same political system. It may be inferred, therefore, that protection is not demanded except in cases where the industry would be exposed to the dangerous or successful rivalry of the foreign manufacturer, and therefore is carried on under circumstances which, by increasing the cost of production, render the employment of labor and capital on the same industry in question a less advantageous outlay than they could be in other objects. If it comes to pass that under favorable circumstances the protected industry can cope with un-



protected rivals in a common market, it is clear that the necessity for protection has passed away, and that the existence of the restraint is needless and vexatious. Thus, for example, if it be true that American cotton cloth can successfully compete against Manchester goods in China, or Japan, or Central Africa, it can, *a fortiori*, compete successfully against Manchester goods in the United States itself. But it also follows that, if this position be not attained, the existence of the restraint is a constant impediment to its being attained, because the industry, as estimated by the cost at which its product is attained, invariably accommodates itself to the circumstances which naturally or artificially control its production, especially in reference to the amount of capital and labor devoted to it, and the rate of profit which the manufacturer enjoys. There is no reason to believe that in the protected manufactures of Germany, France and the United States the profit of the manufacturers is greater than is derived from unprotected industries—that, for example, the French ironmaster or cotton-spinner gains a greater advantage from his calling than the wine-grower does. On the contrary, the loudest complaints of declining trade, and the baneful influence of foreign rivalry, are heard from the industries which have successfully demanded the assistance of protective duties. It is always the case, and it always will be the case, that the opulence and prosperity of a country will depend on the success with which its natural industries are prosecuted, and on the prudence which it shows in hitting the proper time in which other industries may be attempted with a reasonable prospect of remunerative profit. For just as weakly plants and animals are the first to succumb to those climatic or atmospheric conditions which are unfavorable to health and vigor, as in the struggle for existence feeble stocks disappear and more energetic forms occupy their place, so industries which need artificial support are the first to feel commercial adversity, and the last to recover from it. It is stated, and the statement is not seriously controverted, however much the true interpretation of the facts is disguised or resisted, that during the period of commercial depression which began after 1874 the countries in which the greatest efforts have been made to sustain artificial industries have suffered more than England, which has conceded no such assistance whatever.

But it is not only in the fact that the producer is able in an atmosphere of free action to interpret the prospects of his own market best, and to solve most readily the problem as to what is the relation between cost of production and possible profit, that the value of free-trade principles is discerned. The same principles which in England have been happily recognized as fundamental have indirectly done more to soften the differences between employer and laborer than anything else. No civilized country has had more reason to fear the consequences of hostility between capital and labor than England has. For nearly five centuries the legislature of that country strove to regulate the rate of wages in the interest of employers. To the numberless and severe statutes of laborers, which began with 1350 and were continued in full force up to 1825, when they were relaxed rather than repealed, is due the English poor law in the first place and the trade union in the second. It was natural, when the English government had been attempting for so long a time to keep down wages by law, and looked with so much hostility on any organization among the working classes which seemed likely to better their lot, that when the severity of these laws was relaxed the laborers should eagerly adopt the

machinery from the use of which they had been so long debarred. But deplorable as has been the combat between labor and capital, and blameworthy as many acts have been on both sides, no one who has given any attention to the subject can fail of noticing that the aims of the trade unions are simple and intelligible, that the representatives of these combinations court debate, criticism and sympathy from the public to which they appeal, and that the struggle is carried on with increasing mildness and forbearance. The English unions do not aim at reconstructing society, nor demand subventions from the state as a means by which they may resist the power of the capitalist, nor adopt those projects which give from time to time such trouble to Continental governments. The fact is, the English parliament has withdrawn all artificial aids from the capitalists, and the workman is content to stand on the same level with his employer as far as the state is concerned. But where, as in other parts of the civilized world, the state, for some reason or the other, has determined on fostering the existence of an industry which cannot exist without state help, or does not think it can, the workman is sure to attempt, with what success he can, either to appropriate a part of the extraordinary profit which the government, in the early stages of its action accords to the capitalist, or to demand that an analogous benefit should be conferred on him by the operation of law. The protective system of Continental Europe is the source and the strength of European socialism, and is responsible for its fallacies and its excesses. Those Englishmen who lived through and watched the simultaneous energies of the Chartist movement and the free-trade agitation had abundant opportunities for inferring what turned out to be the fact, that the success of the latter movement would be a deathblow to the former project. Government in England interferes very little with the action of individuals, but this is possible because government in England abstains as much as possible from meddling with those relations which can be made to adjust themselves. In England the adage of Mr. J. S. Mill, that “the best remedy for the evils of liberty is more liberty,” may be a wise generalization, but when the liberty of labor is curtailed, it is not quite so clear that a government can with safety to itself dispense with that control from which English social life is happily free.

With the exception of these and analogous instances,—when the safety and morals of the public justify, to a larger or smaller extent, the supervision of the state over the free choice of industry,—the concession of that free trade in labor which puts the minimum of hindrance on the field of employment and the character of employment which the producer selects is quite as important to the well being of a state as the concession of a free agency to its capital and a free market for its products. For as all wealth is the produce of labor, and as the efficiency of labor is the first and last condition of national progress, as the efficiency of labor is primarily brought about by the division of employments, and as the division of employments knows no limit as long as the market of products is extended, so it is of the highest interest to the efficiency of labor that the field of its operations should be as open and free as possible.

It may be added to all the above that there are many and weighty arguments urged in favor of the protective tariff policy in effect in the United States during the past thirty years. The entire question is changed in the minds of a large number of people by the questions of expediency, locality, age of manufactures, and



location. It is urged, without going at large into the argument, that the country has been exceedingly prosperous under a protective tariff system—an argument requiring no theoretical demonstration; that the situation of England imperatively demands free trade, while ours is a situation to which protection is an economical necessity. On the other hand, that free trade in the United States would be of enormous commercial advantage to England, and that all the arguments adduced by the Cobden school are based upon that fact, or are at least promulgated and advanced for selfish ends.

The protective system cannot be said to be the final and settled policy of the United States. It is experimental. Though outwardly it is the almost sole question now at issue between the two great parties, it is in its essence not a question of politics, but an economical one, destined to be settled by long experience in results and effects. There are therefore innumerable free-trade republicans and a large body of protectionist democrats. The attempt to draw the lines closely has failed so far as party action is concerned, the result being only to cause the general public to begin a process of thinking, with a view to action at some future time, without haste, and with no special view to parties or party welfare.

The time of this writing is after the general election of 1893. By free-traders and the advocates of a modified protective tariff alike a victory is claimed in that election. The same conclusion is reached by the strict advocates of protection-for-revenue-only. But to one who is disposed to consider the great question outside of his connection with any party, and who is indisposed to use his sentiments or his conclusions for party benefit, this last result at the polls does not bring any definite conclusion except that the final verdict of the public upon the question cannot as yet be definitely foretold, and that so far it has only expressed its opposition to extreme tariff measures and demands a modification of them. There is evidently a feeling that the truth lies between two extremes, that previous to the final decision that the country shall adopt free trade a means must be found for the raising of the enormous revenue that must come from some source, and that does now come from the tax on imports. The question of lowering his wages to the grade established for the British skilled mechanic disturbs the mind of the workman notwithstanding the compensating advantages that it is alleged will accrue to him. The arguments which emanate from foreign sources and have been industriously disseminated excite suspicion in his mind. The conclusion as to the present status of the question which is forced upon the dispassionate and non-partisan observer is that it is by no means yet decided; that the advocates of extreme protection have been rebuked; that the safe experiment of a modified tariff is to be tried, and that upon future results will the final decision of the question depend.

No argument has so little affected the American public as that one which is based upon the morals of the question. Only theorists are as yet ready to seriously maintain that because mankind should be a band of brothers it is morally wrong to still continue to act as though they were not. It is in this country extensively believed that the individual, the family, the community, the State and the nation has so far a moral right to adopt such selfish measures as are necessary to the furtherance of its own welfare. Every person practically follows this rule in his business and private affairs, both in the United States and elsewhere.

It is agreed to by all parties to the controversy in the United States that free trade may finally become the policy of every civilized nation. But existing circumstances now control the situation. They may change or may be made to change. Nothing sudden or radical is to be expected, and when such change is advocated men of all parties demur. The question is by no means one-sided. The arguments adduced by both parties are seen by the public to be cogent, and in many cases, both views are in a sense indisputable.

**FREEWILL BAPTISTS**, a denomination of Baptists in the United States and Canada, holding similar doctrines to those of the General Baptists of England. Founded in 1780 by Benjamin Randall, a Baptist preacher, who had been censured for teaching anti-Calvanistic doctrines, it soon made considerable progress, and, in 1827, a general conference, meeting every three years, was instituted. Besides erecting numerous schools of different grades, the Freewill Baptists have established three colleges, one at Lewiston, Me., one at Ridgeville, Md., and a third at Hillsdale, Mich., to which both sexes, and colored people as well as whites, are admitted. A fourth college has since been erected at Rio Grande, Ohio. In 1889 the denomination had 1,619 churches in the United States, with 1,414 preachers, and 86,201 communicants. In Nova Scotia and New Brunswick there is a separate conference, the membership connected with which is upward of 9,000.

**FREEZING MIXTURES, AND OTHER MEANS OF COOLING.** When matter passes from the solid into the liquid state, heat in large quantities disappears. When a piece of ice, having a temperature of 32° F., is placed in its own weight of water at 174°, we find, on testing the water with the thermometer after the ice has melted, that its temperature is 32°; the heat which the water contained having disappeared during the melting of the ice. Ammonia and sulphuric ether are much used to create artificial cold, and in many American breweries are used instead of ice. For **ICE MACHINES** and **COLD STORAGE** see **Art. ICE**.

**FREIBERG**, or **FREYBERG**, a town of Saxony, is situated on the Münzbach, not far from its confluence with the Mulde, and nineteen miles southwest of Dresden. Population in 1889, 25,000.

**FREIBURG**, or **FRIBOURG** (the French form of the name), a canton of Switzerland, is situated in the district to the southeast of the lake of Neuchatel and the northeast of the lake of Geneva. Population, 120,000.

**FREIBURG**, the chief town of the above canton, with a station on the line between Bern and Geneva, occupies a highly picturesque situation in the valley of the Sarine, part of it lying in the bottom of the ravine and part of it climbing the irregular eminences on the left. Population, 11,000.

**FREIBURG**, or **FREYBURG**, usually distinguished as Freiburg in the Breisgau, is a city formerly of the Austrian dominions but now in the grand-duchy of Baden, about twelve miles east of the Rhine, at the foot of the Schlossberg, one of the heights of the Black Forest range. Population, 36,000.

**FREIBURG**, distinguished as Freiburg unter dem Furstenstein, a garrison town in the government district of Breslau, Silesia, is situated on the Polnitz, thirty-five miles southwest of Breslau. Population, 8,000.

**FREIDANK**, **FREIGEDANK**, or in Middle High German, **VRIDANC**, the name by which a certain German didactic poet of the thirteenth century is usually known. It has been disputed whether the word, which



is equivalent to freethought, is to be regarded as the poet's real family name or only as a pseudonym; according to Pfeiffer the former is the case.

FREILIGRATH, FERDINAND, a popular German poet, was born June 17, 1810, at Detmold, where his father was a teacher in the Stadtschule. His first volume, published at the age of twenty-eight, made him the favorite poet of his day, and it was not long before he was drawn into political expression in his poems and writings and was compelled to fly from his native country in 1844. He returned, however, on the proclamation of amnesty to political offenders, but was again compelled to flee in 1851. He remained in England till 1868. In 1866 a national testimonial, which ultimately reached the sum of 60,000 thalers, was set on foot in Germany, for the purpose of providing a pension for the poet in his old age; and when, two years later, a general amnesty was granted to political offenders, Freiligrath returned to his native country, and was received with public enthusiasm. He now settled in Stuttgart, where, at the beginning of the Franco-German war, he wrote some since popular songs, such as *Hurrah Germania!* and the *Trompete von Gravelotte*. He removed to Cannstadt in 1875, and died there, March 18, 1876.

FREIND, JOHN, English physician, was born in 1675 at Croton, in Northamptonshire. In 1722 he entered parliament as member for Launceston, in Cornwall, but, being suspected of favoring the cause of the exiled Stuarts, he spent half of that year in the Tower. During his imprisonment he conceived the plan of his most important and valuable work, *The History of Physic*, of which the first part appeared in 1725, and the second in the following year. In the latter year he was appointed physician to Queen Caroline, an office which he held till his death, July 26, 1728.

FREIRE, FRANCISCO JOZE (1713-1773), a Portuguese historian and philologist, was born at Lisbon.

FREISCHÜTZ is, in German folklore, a marksman who, by a compact with the devil, has obtained a certain number of bullets destined to hit without fail whatever object he wishes. As the legend is usually told, six of the *Freikugeln* or "free bullets" are thus subservient to the marksman's will, but the seventh is at the absolute disposal of the devil himself. Stories about the Freischütz were especially common in Germany during the fourteenth, fifteenth and sixteenth centuries; but the first time that the legend was turned to literary profit is said to have been by Apel in the "Book of Ghosts." It has become universally known as the basis of Weber's opera *Der Freischütz* (1821), the libretto of which was written by Frederick Kind, who had suggested Apel's story as an excellent theme for the composer.

FREISING, FREYSING, or FREISINGEN, a town of Bavaria, district of Upper Bavaria, is situated on the Isar, twenty miles north-northeast of Munich.

FREIWALDAU, a town in Austrian Silesia, circle of Troppau, is situated in a pleasant valley forty miles west-northwest of Troppau.

FRÉJUS, the ancient *Forum Julii*, a town of France, department of Var, about a mile from the Mediterranean. At St. Raphael, a fishing village about a mile and a half distant, Napoleon disembarked on his return from Egypt in 1799, and reëmbarked for Elba in 1814.

FREMONT, the county seat of Dodge county, Nebraska, is situated on the north bank of the Platte river, forty-seven miles west-northwest of Omaha, on the Union Pacific railroad. It is a considerable shipping point for grain, and has some manufactures, ten churches, good schools, three national and two savings banks, and a population (1890) of 6,654.

FREMONT, a city of the United States of America, capital of Sandusky county, Ohio, is situated on the Sandusky river, at the head of navigation, thirty miles east of Toledo by rail. Steamers ply between the city and the principal ports of Lake Erie, and it has manufactures of woolens, sashes and blinds, flour mills, and engineering works. Population in 1890, 7,140.

FRENCH, NICHOLAS, an Irish political pamphleteer, was born in Wexford in 1604. Shortly before his death, which took place August 23, 1678, he was nominated coadjutor-archbishop of Ghent.

FRERE, JOHN HOOKHAM, an English diplomatist and author, was born in London, May 21, 1769. He entered public service in the foreign office under Lord Grenville, and sat from 1796 to 1802 as member of parliament for the close borough of Looe in Cornwall. On Canning's removal to the board of trade in 1799, he succeeded him as under secretary of state; in October, 1800, he was appointed envoy extraordinary and plenipotentiary to Lisbon; and on September, 1802, he was transferred to Spain, where he remained for two years. After the disastrous retreat of Sir John Moore to Corunna, the public accused Frere of having by his advice endangered the British army, and though no direct censure was passed upon his conduct by the government, he was called home, and the Marquis of Wellesley was appointed in his place. He died in Malta in 1841.

FRERET, NICOLAS, a French scholar, one of the most learned men of his age, was born at Paris, February 7 or 15, 1688. Among his early studies history, chronology, and mythology held a prominent place. He was hardly twenty-six years of age when he was admitted as pupil to the Academy of Inscriptions. His multifarious pursuits left him no time for carrying on the publication of the *Mémoires* of the Academy, an enormous arrear of which had to be made up by his successor. He died at Paris, March 8, 1749.

FRÉRON, ÉLIE CATHERINE (1719-1776), a French critic and controversialist, was born at Quimper. Fréron is now remembered solely for his attacks on Voltaire and the Encyclopedists, and the fame of his criticisms is not due to their inherent merits, which, notwithstanding a certain clever malignity, are very slight, but to the retaliations they provoked on the part of Voltaire.

FRÉRON, LOUIS STANISLAS, a French Revolutionist, son of the preceding, was born at Paris in 1765. On the outbreak of the Revolution, Fréron, who was a schoolfellow of Robespierre and Camille Desmoulins, established the violent journal *L'Orateur du Peuple*. Commissioned along with Barras in 1793 to establish the authority of the Convention at Marseilles and Toulon, he distinguished himself equally with his colleague in the atrocity of his reprisals, but both afterward joined the Thermidoriens, and Fréron became the leader of the *Jeunesse Dorée*. He died in 1802 at St. Domingo, where he was for a few months subprefect.

FRESCO. Fresco-painting is the art of mural painting upon freshly-laid plaster lime while it remains damp, with colors capable of resisting the caustic action of the lime with which they are mixed or brought into contact. The art of painting with colors mixed with lime is very ancient; it was in use in Egypt from the remotest periods of the monumental history of that country. The colors used were earths, which were mixed with lime and laid on in flat tints, and earths for the most part are the colors still employed in fresco-painting. The Romans probably owing to Greek influence and example, carried the art much further than their Etruscan predecessors, and established real fresco-painting in Italy. Vitruvius remarks, "colors when carefully applied on moist stucco do not



therefore fade, but last forever. Stuccoed walls, when well executed, do not easily become dirty, nor do they lose their colors when they require to be washed, unless the painting was carelessly done, or executed after the surface was dry." This is emphatically descriptive of fresco-painting. In this art it is essential that a given amount of plaster be laid for the painter at one time,—in modern practice only enough for a day's work,—and therefore frescoes are readily recognized by the joinings in the plaster, most frequently following the outlines of the figures or other objects. These joinings vary in distinctness in different works according to the skill of the plasterer.

FRESCOBALDI, GIROLAMO, a celebrated musical composer was born at Ferrara in 1587. Frescobaldi's compositions show the consummate art of the early Italian school, and his works for the organ more especially are full of the finest devices of fugal treatment. He also wrote numerous vocal compositions, such as canzone, motets, hymns, etc., a collection of madrigals for five voices being among the earliest of his published works. The year of his death is not sufficiently established.

FRESNEL, AUGUSTIN JEAN (1788–1827), an illustrious French physicist, the son of an architect, was born at Broglie, in the department of Eure, in France.

FRESNILLO, a town of Mexico, in the state of Zacatecas, is situated thirty miles northwest of Zacatecas, on a branch of the Santiago river, in the plain which divides the mountains of Santa Cruz and Deganos from the Zacatecas range. Population (1890) about 16,000.

FRESNO, the county seat of Fresno county, California, is in the exact center of the State, 207 miles southeast of San Francisco, on the Southern Pacific railroad. The population in 1890 was 10,818. Fresno lies in the fertile San Joaquin valley, and while formerly devoted to grain and stock raising, the country is now mainly given up to fruit growing. The raisin crop of Fresno proper aggregates 10,000,000 pounds annually, and 2,500,000 gallons of wine are produced each year. Oranges, figs, and olives are also largely grown, as well as the more hardy fruits. The manufactures of Fresno comprise machine shops and foundries, agricultural implement works, marble and stone cutting yards, and extensive flouring mills. The county of Fresno contains a million acres of heavily timbered land, from which 15,000,000 feet of lumber are annually cut. Thirteen saw mills are in operation. Among the public buildings of the city are the court-house, occupying a block and costing \$60,000; a masonic temple, a club house, nine churches, three hotels, high and graded schools. There are two national and three private banks, and two daily and three weekly papers. The city is lighted by electricity, has water-works and street railways.

FRESNOY, CHARLES ALPHONSE DU (1611–1665), a painter and writer on his art, was born in Paris, son of an apothecary.

FREUDENSTADT, a town of Würtemberg, circle of the Black Forest, on the right bank of the Murg, forty-two miles west-southwest of Stuttgart.

FREUDENTHAL, a town of Austrian Silesia, circle of Troppau, on the Black Water, twenty-two miles west of Troppau. Population (1890), 7,000.

FREYA, in Teutonic mythology, one of the Vanen, or spirits of the breathing wind, which have their abode in Vansheim, or middle air between the upper and under world. Freya, or Fregga, becomes the wife of Odur or Woden (Odin), and the mother of Jörd, the earth, thus answering to the Greek Demeter. In the myth of Thor, whose hammer is stolen by the giant

Thoym, Freya lends her feather garment to Loki, and thus enables him to go in search of it. Thoym refuses to give it up, unless Freya will consent to be his wife; and as Freya will not go, Thor, on the advice of the Heimdall, descends to Jötunheim in the disguise of a bride, and Thoym, taking the god to be Freya, meets his doom at his hands at the moment of his fancied nuptials.

FREYCINET, LOUIS, CLAUDE DESAULSES DE, French navigator, was born at Montelimart in Dauphiny, 1779. In 1793 he entered the French navy. After taking part in several engagements against the English, he joined in 1800, along with his brother Henri Louis (1777–1840) who afterward rose to the rank of admiral, the expedition sent out under Captain Baudin in the *Naturaliste* and *Géographe* to explore the south and southwest coasts of Australia. Much of the ground already gone over by Flinders was revisited, and new names imposed by this expedition, which claimed credit for discoveries really made by the English navigator (see FLINDERS). In 1805 Louis returned to Paris, and was intrusted by government with the work of preparing the maps and plans of the expedition. In 1817 he commanded the *Uranie* in which Arago and others went to Rio de Janeiro, to take a series of pendulum measurements. Freycinet was admitted into the Academy of Sciences in 1825, and was one of the founders of the Paris Geographical Society. He died August 18, 1842.

FREYTAG, GEORG WILHELM FRIEDRICH, Arabist, was born at Lüneburg on September 19, 1788. Besides publishing a compendium of Hebrew grammar and a treatise on Arabic versification, he edited two volumes of Arabic songs and three of Arabic proverbs. But his principal work was the laborious and praiseworthy *Lexicon Arabico-Latinum* (1830–37), which rapidly superseded the earlier lexicons, and which, though not to be compared with the magnificent effort of Lane, is likely to remain long in current use as embodying the best results of the labors of De Sacy and his school.

FRIAR, from the Latin *frater* through the French *frère*, a secondary form of a word which is common to all the Aryan languages, is a name commonly applied in English to any lay member of any mendicant order. One who has received ordination is usually dignified with the appellation of father. The church of Rome at present recognizes a considerable number of mendicant orders; but at the time when the word first became current in England, there were practically only four, namely, those which alone had been sanctioned by Pope Gregory X. at the second council of Lyons in 1274. They were the Eremitic or Austin Friars, the Carmelites or White Friars, the Dominicans or Black Friars (sometimes also called preaching friars), and the Franciscans, Minors, or Gray Friars. See MONACHISM, CARMELITES, DOMINICANS, FRANCISCANS.

FRIBOURG. See FREIBURG.

FRICITION is the resistance which every material surface presents to the sliding of any other such surface upon it. This resistance is due to the roughness of the surfaces; the minute projections upon each enter more or less into the minute depressions on the other, and when motion occurs these roughnesses must either be worn off, or continually lifted out of the hollows into which they have fallen, or both, the resistance to motion being in either case quite perceptible and measurable. Friction is preferably spoken of as "resistance" rather than "force," for a reason exactly the same as that which induces us to treat stress rather as molecular resistance (to change of form) than as force, and which may be stated thus:—although friction can be utilized as a moving force at will, and is continually so used, yet



it cannot be a primary moving force; it can transmit or modify motion already existing, but cannot in the first instance cause it. For this some external force, not friction, is required. The analogy with stress appears complete; the motion of the "driving link" of a machine is communicated to all the other parts, modified or unchanged as the case may be, by the stresses in those parts; but the actual setting in motion of the driving link itself cannot come about by stress, but must have for its production force obtained directly from the expenditure of some form of energy. It is important, however, that the use of the term "resistance" should not be allowed to mislead. Friction resists the motion of one surface upon another, but it may and frequently does confer the motion of the one upon the other, and in this way causes, instead of resists, the motion of the latter.

FRIEDLAND, a town of Bohemia, the chief town of a circle, is situated in the valley of the Wittich at the confluence of that river with the Rasnitz, fourteen miles east of Zittau. Population, 5,000.

FRIEDLAND, a town of Germany, in the grand-duchy of Mecklenburg-Strelitz, circle of Stargard, is situated on the Mühlenteich, thirty-five miles northeast of Strelitz. Population (1890), 5,200.

FRIEDLAND, a town of Prussia, in the government district of Königsberg, province of Prussia, is situated on the Alle, twenty-seven miles southeast of Königsberg. At Friedland Napoleon gained a victory over the Russians under Bennigsen (June 14th), which led to the peace concluded at Tilsit July 7, 1807.

FRIEDLAND, VALENTINE. See TROTZENDORF.

FRIENDLY ISLANDS. The group thus named by Captain Cook, and otherwise called after the name of its chief island Tonga, was discovered by Tasman in 1643. It lies in the South Pacific, on the southwest limits of the area occupied by the Polynesian race, about 350 miles south-southwest from Samoa, and 250 east-southeast from Fiji. The long chain of islands numbers about 150, with a collective area hardly exceeding 400 square miles.

FRIENDLY SOCIETIES are a British institution, inaugurated among the poorer classes for mutual assurance against the distress arising from sickness, death, accident or other causes of destitution. The formation of these societies dates from the beginning of the eighteenth century. They were at first merely a banding together of a few persons on unscientific principles, but of late years they have been subjects of parliamentary action, and they are now limited by law to operation on a basis founded on the experience deduced from the actuaries' tables of insurance. They are limited to annuities of £50 and gross premiums of £200.

FRIENDS, SOCIETY OF. See QUAKERS.

FRIES, ELIAS MAGNUS (1794-1878), an eminent Swedish botanist, was born at Smaland.

FRIES, JACOB FRIEDRICH (1773-1843), a distinguished post-Kantian writer on philosophy, was born at Barby, Saxony.

FRIESLAND, or VRIESLAND, sometimes called West Friesland, to distinguish it from East Friesland in Hanover, is the most northerly province of the Netherlands. It is bounded on the southwest, west and north by the Zuyder Zee and the North Sea, on the east by the provinces of Groningen and Drenthe, and on the southeast by that of Overijssel. Population, 330,000.

FRIGATE (probably connected with the Goth. *fargod*, a row-galley, and also with the Lat. *aphractus*, an undecked galley), formerly, a long narrow vessel propelled by oars and sails, used in the Mediterranean on occasions when speed was requisite. The name then came to be applied to men-of-war, of a class smaller

than line-of-battle ships, and carrying from twenty to fifty guns, which were employed in the great wars of the eighteenth century and early part of the nineteenth century, as scouts and cruisers. The frigate was usually swift, easily managed, and capable of beating well up to the wind. She became, therefore, the favorite ship in war-time, and bore off a large proportion of the prize-money. With steam, and the growth of the fleet in later times, frigates were developed more than any other men-of-war, and many of the largest ships belonged to this class.

FRIGATE-BIRD, the name commonly given by the sailors, on account of the swiftness of its flight, its habit of cruising about near other species and of daringly pursuing them, to a large Sea-bird—the *Fregata aquila* of most ornithologists.

FRISCHLIN, NICODEMUS, scholar and poet, was born September 22, 1547, at Balingen, Württemberg, where his father was parish minister. He was educated at Tübingen, and in 1568 was promoted to the chair of poetry and history. In 1575 for his comedy of *Rebecca*, which he read at Ratisbon before the emperor Maximilian II., he was rewarded with the laureateship and with the honor of knighthood. Some time afterward he was made a comes palatinus. In 1582 his unguarded language and his reckless life had made it necessary that he should leave Tübingen; he accordingly accepted a quiet mastership at Laibach in Carniol, which he held for about two years. Shortly after his return to the university in 1584, he was threatened with a criminal prosecution on a charge of immoral conduct, to which it was alleged, he had exposed himself some years previously, and the threat led to his withdrawal to Frankfurt in 1587. Of the remaining four years of his life little is recorded.

FRISI, PAOLA, a celebrated mathematician and astronomer, was born at Milan in 1728. In 1753 he was elected a corresponding member of the Paris Academy of Sciences, and shortly afterward he became professor of philosophy in the Barnabite College of St. Alexander at Milan. An acrimonious attack by a young Jesuit, about this time, upon his dissertation on the figure of the earth laid the foundation of his animosity against the Jesuits, with whose enemies, including D'Alembert, Condorcet, and other Encyclopedists, he later closely associated himself. In 1756 he was appointed by Leopold, grand duke of Tuscany, to the professorship of mathematics in the University of Padua, a post which he held for eight years. He was made in 1757 an associate of the Imperial Academy of St. Petersburg, and a foreign member of the Royal Society of London, and in 1758 a member of the Academy of Berlin, in 1766 of that of Stockholm, and in 1770 of the Academies of Copenhagen and of Bern. From several European crowned heads he received, at various times, marks of special distinction, and the empress Maria Theresa granted him a yearly pension of 100 sequins (£50). He died November 22, 1784.

FRISIANS, a people of Teutonic stock, who, at their first appearance in history, are found in possession of the same district of Europe which they still, at least partially, occupy. So far as can be judged they have never been of an aggressive disposition, and it is not improbable that at one time they may have possessed a much wider territory than history usually assigns them. The boundaries of Frisia proper are the Scheldt toward the west, and the Weser toward the east, and it never extended far inland from the coast of the German Ocean. But there is also a district of Schleswig in Denmark, extending along the west coast from the Eider northward to Töndern, in which the common language still gives evidence of a Frisian population;



the same may be said of the neighboring islands of För, Silt, Heligoland, etc.; and it is no improbable supposition that not only the Ditmarsch district to the south of the Eider, but also the whole maritime country westward to the Weser, was at an earlier period in the hands of distinctly Frisian tribes. If the presence of geographical names ending in *um*, the Frisian equivalent to the German *heim* and the Saxon *ham*, may be taken as sufficient evidence of Frisian occupation, Doctor Latham, in his notes to the *Germania* of Tacitus, has elaborately shown that there have been Frisian settlements as far north in Denmark as the Lijmfiord, and as far east as the islands of Funen and Zealand. By the older historians of Denmark and the countries of Lower Germany, the Frisian district in Denmark is frequently called *Frisia Minor* or Lesser Frisia, which, however, must not be confounded with the unexplained distinction which Tacitus makes between *Frisii Majores* and *Frisii Minores*.

The history of the Frisians, in spite of the labors of a few investigators like Wiarda and Richthofen, has hitherto been left in many respects in a very fragmentary and untrustworthy condition; and rash assertions of uncritical chroniclers have undisputed currency. For this neglect the principal reason is undoubtedly the fact that the people have, at least in modern times, displayed no strong political individuality, but have allowed themselves peacefully to be merged in more powerful nationalities.

The Frisian language is a member of the Low German branch of the Teutonic, and presents special interest to the English philologist as the nearest of all extant forms to the Saxon basis of his own tongue. It is still spoken in the country districts of the present province of West Friesland; in a much more Germanized condition it still exists in Saterland, in East Friesland; in strangely differentiated dialects it holds its own in many of the islands along the coast; and, in spite of the encroachments of Low German on the one hand, and Danish on the other, it survives in the country between Husum and Töndern.

FRITH or FRYTH, JOHN (*cir.* 1503–1533), an eminent pioneer of the Reformation in England, was born at Westerham, Kent, where his father kept an inn. He was educated at Eton, and afterward at King's College, Cambridge, where Gardiner, who subsequently became bishop of Winchester, was his tutor. Frith's first publication in fact was a translation of Hamilton's *Places*, made shortly after the martyrdom of their author; and soon afterward the *Revelation of Antichrist*, a translation from the German appeared, along with *A Pistle to the Christen Reader*, by "Richard Brightwall" (supposed to be Frith), and *An Antithesis wherein are compared togeder Christes Actes and our Holye Father the Popes*, dated "at Malborow in the lande of Hesse," July 12, 1529. His *Disputacyon of Purgatorye*, a treatise in three books, against Rastell, Sir T. More, and Fisher (bishop of Rochester) respectively, was published at the same place in 1531. In 1532, probably in July or August, he ventured back to England, apparently on some business to which he and Tyndal attached importance in connection with the prior of Reading. Warrants for his arrest were almost immediately issued at the instance of Sir T. More, then lord chancellor. For some weeks Frith successfully evaded pursuit, but ultimately, in December, he fell into the hands of the authorities at Milton Shore in Essex, as he was on the point of making his escape to Flanders. The rigor of his imprisonment in the Tower was somewhat abated when Sir T. Audley succeeded to the chancellorship, and it was understood that both Cromwell and Cranmer were disposed to show great leniency.

Henry ordered that Frith should be examined; the result of a regular trial which followed was that he was found guilty of having denied, with regard to the doctrines of purgatory and of transubstantiation, that they were necessary articles of faith. On June 23, 1533, he was handed over to the secular arm, and at Smithfield on July 4th following he was burnt at the stake.

FRITHJOF'S SAGA, which was probably first written down at the end of the thirteenth or in the beginning of the fourteenth century, is an ancient Icelandic myth, which records the life and adventures of the hero Frithjof (properly *Fridhthjofr*—*i. e.*, "peace-destroyer"), who loved the beautiful Ingeborg, the daughter of a petty king of Norway. Frithjof is supposed to have lived in the eighth century; but some writers assign to him a much earlier period.

FRITZLAR, a town formerly of Electoral Hesse and now of Prussia, at the head of a circle in the district of Cassel, on the left bank of the Eder, a left-hand tributary of the Weser. Population, 3,500.

FRIULI, a district at the head of the Adriatic, at present divided between Italy and Austria, the Italian portion being included in the province of Udine, and the Austrian comprising the countship of Görtz and Gradiska, and the so-called Idrian district. It has a population of 700,000.

FROBEN, JOANNES (Latinized name *Frobenius*), a German printer and scholar, was born at Hammelburg in Franconia about 1460, and died in 1527.

FROBISHER, SIR MARTIN (*c.* 1535–94), English navigator and explorer, was born, it is usually stated, at Doncaster, but more probably at Altofts in the parish of Normanton, Yorkshire. Martin was sent to London to his mother's brother, Sir John York, and in 1554 went with a small fleet of merchant ships to Guinea under Admiral John Lock. We next hear of him in 1565 as Captain Martin Frobisher, and again in 1571 as superintending at Plymouth the building of a ship to be employed against the Irish. As early as 1560 or 1561 Frobisher had conceived the idea of discovering a north-west passage to Cathay, a short route to which was the motive of most of the Arctic voyages undertaken at that period and for long after. For years he schemed and plotted, and solicited in all quarters, from the court downward, to obtain means to carry his favorite project into execution; and it was only in 1576 that, mainly by help of the earl of Warwick, he was put in command of two tiny barks, the *Gabriel* and *Michael*, mere cockle shells of about twenty tons each, and a pinnacle of ten tons, with an aggregate crew of thirty-five. On June 7th, Frobisher left Blackwall, and having received a good word from Queen Elizabeth at Greenwich, the expedition, if we may apply to it so considerable a term, sailed northward to the Shetland Islands. Stormy weather had been met with, in which the pinnacle was lost, and sometime after the *Michael* deserted. After passing Greenland and being nearly wrecked, the *Gabriel* reached the coast of Labrador on July 28th. Some days later Hall's Island, at the mouth of Frobisher Bay, was reached, and a landing effected. Among the things hastily brought away by the men was some "black earth," which played an important part in connection with Frobisher's further career. Sailing up Frobisher Bay, then thought to be a strait, they reached Butcher's Island on August 18th. Here some natives were met with, and intercourse carried on with them for some days, the result being that five of Frobisher's men were decoyed and captured, and never more seen. After vainly trying to get back his men, Frobisher turned homeward, and reached London on October 9th. It seemed as if nothing more was to come of this expedition, when it was noised abroad that the appa-



rently valueless "black earth" was really a lump of gold ore.

It is difficult to say how this rumor arose, and whether there was any truth in it, or whether Frobisher was a party to a deception, in order to obtain means to carry out the great idea of his life. The story, at any rate, was so far successful; the greatest enthusiasm was manifested by the court and the commercial and speculating world of the time; and next year a much more important expedition than the former was fitted out, the queen lending Frobisher from the royal navy a ship of 200 tons. A Cathay company was established, with a charter from the crown, giving the company the sole right of sailing in every direction but the east; Frobisher was appointed high admiral of all lands and waters that might be discovered by him.

On May 26, 1577, the expedition, which, besides the royal ship, the *Aid* of 200 tons, consisted of the *Gabriel* and *Michael* of the previous year, with boats and pinnaces and an aggregate complement of 120 men, including miners, refiners, etc., left Blackwall, and sailing by the north of Scotland, arrived at Greenland early in July. Hall's Island was reached on the 18th, and though no more "black earth" was found there, abundance of it was found on other islands, and the ships well loaded with it. The country around, under the name of *Meta Incognita*, was solemnly taken possession of in the queen's name. Several weeks were spent in Frobisher Bay collecting ore, but very little was done in the way of discovery. There was much parleying and some skirmishing with the natives, and earnest but futile attempts made on the part of Frobisher to recover the men captured the previous year. The return was begun on August 22d, and the *Aid* reached Milford Haven on September 20th; the *Gabriel* and *Michael* having separated, arrived later at Bristol and Yarmouth. Frobisher was received and thanked by the queen at Windsor. Great preparations were made and considerable expense incurred for the assaying of the great quantity of "ore" brought home, in the testing of which the queen manifested a strong personal interest. This took up much time, and led to considerable dispute among the various parties interested. Meantime the faith of the queen and others remained strong in the productiveness of *Meta Incognita*, and it was resolved to send out a larger expedition than ever, with all necessities for the establishment of a colony of one hundred men. The queen herself contributed two ships of four hundred and two hundred tons, manned with one hundred and fifty men, and carrying one hundred and twenty pioneers. Besides these the fleet contained other thirteen vessels of various sizes, carrying other two hundred and fifty men, and the most elaborate and minute instructions were drawn up for the conduct of the expedition. Frobisher was again received by the queen at Greenwich, and her majesty threw a fine chain of gold around his neck. On May 31st the expedition left Harwich, and sailing by the English Channel, reached Greenland on June 19th. This time Frobisher and some of his men managed to land, "being the first known Christians that we have true notice of that ever set foot upon that ground." In the first days of July Frobisher Bay was reached, but stormy weather and dangerous ice drove the fleet southward, and unwittingly Frobisher entered what was afterward known as Hudson Strait, up which he sailed about sixty miles. When he found that he was sailing away from his destination, he, with apparent reluctance, turned back, and after many buffetings part of the fleet managed to come to anchor in Frobisher Bay. Some attempt was made at founding a settlement, and immense quantities of ore were shipped.

But, as might be expected, there was much dissension and not a little discontent among so heterogeneous a company, and on the last day of August the fleet set out on its return to England, which was reached in the beginning of October. Thus ended what was little better than a fiasco, though Frobisher himself cannot be held to blame for the result; the scheme was altogether chimerical, and the "ore" seems to have been not worth smelting. Between 1578 and 1585 we hear little of Frobisher, though he seems to have been doing service at various places, and steadily advancing in the good opinion of those in power. In 1580 he obtained the revision of the clerkship of the royal navy, of no immediate value. In 1585 he commanded in the *Primrose* in Sir F. Drake's expedition to the West Indies, in the large booty brought home from which he no doubt had a good share. For the next year or two he was employed in various responsible services against the designs of Spain, and in 1588 he did such excellent work in the *Triumph* against the Spanish Armada that he was rewarded with the honor of knighthood. He continued to cruise about in the Channel until 1589, when he was sent in command of a small fleet to the coast of Spain. In 1591 he visited his native Altofts, and there married a daughter of Lord Wentworth. He had prospered during recent years and was able to become a landed proprietor in Yorkshire and Notts. But he found little leisure for a country life, and was soon on the seas again watching and cutting off the richly laden ships of Spain. In November, 1594, he took part in the siege of Crozan, near Brest, and received a wound from which he died at Plymouth on November 22d.

FROEBEL, FRIEDRICH WILHELM AUGUST, philosopher, philanthropist, and educational reformer, was born at Oberweissbach, a village of the Thuringian Forest, on April 21, 1782. He completed his seventieth year, and died at Marienthal, near Bad-Liebenstein, on June 21, 1852. Like Comenius, with whom he had much in common, he was neglected in his youth, and the remembrance of his own early sufferings made him in after life the more eager in promoting the happiness of children. Left to himself in the Thuringian Forest, Froebel began to study nature, and without scientific instruction he obtained a profound insight into the uniformity and essential unity of nature's laws. No training could have been better suited to strengthen his inborn tendency to mysticism; and when he left the Forest at the early age of seventeen, he seems to have been possessed by the main ideas which influenced him all his life. The conception which in him dominated all others was the unity of nature; and he longed to study natural sciences that he might find in them various applications of nature's universal laws. With great difficulty he got leave to join his elder brother at the university of Jena, and there for a year he went from lecture-room to lecture-room hoping to grasp that connection of the sciences which had for him far more attraction than any particular science in itself. But Froebel's allowance of money was very small, and his skill in the management of money was never great, so his university career ended in an imprisonment of nine weeks for a debt of thirty shillings. He then returned home with very poor prospects, but much more intent on what he calls the course of "self-completion," than on "getting on" in a worldly point of view. He was soon sent to learn farming, but was recalled in consequence of the failing health of his father. In 1802 the father died, and Froebel, now twenty years old, had to shift for himself. It was some time before he found his true vocation, and for the next three and a half years we find him at work now in one part of Germany now in



another,—sometimes land-surveying, sometimes acting as accountant, sometimes as private secretary; but in all this his “outer life was far removed from his inner life,” and in spite of his outward circumstances he became more and more conscious that a great task lay before him for the good of humanity. The nature of the task, however, was not clear to him, and it seemed determined by accident. While studying architecture in Frankfort-on-the-Main, he became acquainted with the director of a model school who had caught some of the enthusiasm of Pestalozzi. This friend saw that Froebel’s true field was education, and he persuaded him to give up architecture and take a post in the model school. In this school Froebel worked for two years with remarkable success, but he then retired and undertook the education of three lads of one family. In this he could not satisfy himself, and he obtained the parents’ consent to his taking the boys to Yverdon, near Neuchatel, and there forming with them a part of the celebrated institution of Pestalozzi. Thus from 1807 till 1809 Froebel was drinking in Pestalozzianism at the fountain head, and qualifying himself to carry on the work which Pestalozzi had begun. For the science of education he had to deduce from Pestalozzi’s experience principles which Pestalozzi himself could not deduce. And Froebel, the pupil of Pestalozzi, and a genius like his master, completed the reformer’s system; taking the results at which Pestalozzi had arrived through the necessities of his position, Froebel developed the ideas involved in them, not by further experience but by deduction from the nature of man, and thus he attained to the conception of true human development and to the requirements of true education.

Holding that man and nature, inasmuch as they proceed from the same source, must be governed by the same laws, Froebel longed for more knowledge of natural science. He therefore determined to continue the university course which had been so rudely interrupted eleven years before, and in 1811, he began studying at Göttingen, whence he proceeded to Berlin. But again his studies were interrupted, this time by the king of Prussia’s celebrated call “to my people.” Though not a Prussian, Froebel was heart and soul a German. He therefore responded to the call, enlisted in Lützow’s corps, and went through the campaign of 1813. But his military ardor did not take his mind off education. Froebel’s soldiering showed him the value of discipline and united action, how the individual belongs not to himself but to the whole body, and how the whole body supports the individual.

Froebel was rewarded for his patriotism by the friendship of two men whose names will always be associated with his, Langethal and Middendorff. These young men, ten years younger than Froebel, became attached to him in the field, and were ever afterward his devoted followers, sacrificing all their prospects in life for the sake of carrying out his ideas.

At the peace of Fontainebleau (signed in May, 1814,) Froebel returned to Berlin, and became curator of the museum of mineralogy under Professor Weiss. In accepting this appointment from the government he seemed to turn aside from his work as educator; but if not teaching he was learning. More and more the thought possessed him that the one thing needful for man was unity of development, perfect evolution in accordance with the laws of his being; such evolution as science discovers in the other organisms of nature. He at first intended to become a teacher of natural science, but before long wider views dawned upon him. Langethal and Middendorff were in Berlin, engaged in tuition. Froebel gave them regular instructions in his theory, and at length, counting on their support, he

resolved to set about realizing his own idea of “the new education.” This was in 1816. Three years before one of his brothers, a clergyman, had died of fever caught from the French prisoners. His widow was still living in the parsonage at Griesheim, a village on the Ilm. Froebel gave up his post, and set out for Griesheim on foot, spending his very last groschen on the way for bread. Here he undertook the education of his orphan niece and nephews, and also of two more nephews sent him by another brother. With these he opened a school and wrote to Middendorff and Langethal to come and help in the experiment. Middendorff came at once, Langethal a year or two later, when the school had been moved to Keilhau, another of the Thuringian villages, which became the Mecca of the new faith. In Keilhau Froebel, Langethal, Middendorff, and Barop, a relation of Middendorff’s, all married and formed an educational community. Such zeal could not be fruitless, and the school gradually increased, though for many years its teachers, with Froebel at their head, were in the greatest straits for money, and at times even for food. After fourteen years’ experience he determined to start other institutions to work in connection with the parent institution at Keilhau, and being offered by a private friend the use of a castle on the Wartensee, in the canton of Lucerne, he left Keilhau under the direction of Barop, and with Langethal he opened the Swiss institution. The ground, however, was very ill chosen. The Catholic clergy resisted what they considered as a Protestant invasion, and the experiment on the Wartensee and at Willisau in the same canton, to which the institution was moved in 1833, never had a fair chance. It was in vain that Middendorff at Froebel’s call left his wife and family at Keilhau, and labored for four years in Switzerland without once seeing them. The Swiss institution never flourished. But the Swiss Government wished to turn to account the presence of the great educator; so young teachers were sent to Froebel for instruction, and finally Froebel moved to Burgdorf (a Bernese town of some importance, and famous from Pestalozzi’s labors there thirty years earlier) to undertake the establishment of a public orphanage, and also to superintend a course of teaching for schoolmasters. The elementary teachers of the canton were to spend three months every alternate year at Burgdorf, and there compare experiences, and learn of distinguished men, such as Froebel and Bitzius. In his conferences with these teachers Froebel found that the schools suffered from the state of the raw material brought into them. Till the school age was reached the children were entirely neglected. Froebel’s conception of harmonious development naturally led him to attach much importance to the earliest years, and his great work on *The Education of Man*, published as early as 1826, deals chiefly with the child up to the age of seven. At Burgdorf his thoughts were much occupied with the proper treatment of young children, and in scheming for them a graduated course of exercises, modeled on the games in which he observed them to be most interested. In his eagerness to carry out his new plans he grew impatient of official restraints; so he returned to Keilhau, and soon afterward opened the first *Kindergarten* or “Garden of Children,” in the neighboring village of Blankenburg (1837). Firmly convinced of the importance of the Kindergarten for the whole human race, Froebel described his system in a weekly paper which appeared from the middle of 1837 till 1840. He also lectured in great towns; and he gave a regular course of instruction to young teachers at Blankenburg. But although the principles of the Kindergarten were gradually making their way, the first Kindergarten was failing for



want of funds. It had to be given up, and Froebel, now a widower (he had lost his wife in 1839), carried on his course for teachers first at Keilhau, and from 1848, for the last four years of his life, at or near Liebenstein, in the Thuringian Forest, and in the duchy of Meiningen. It is in these last years that the man Froebel will be best known to posterity, for in 1849 he attracted within the circle of his influence a woman of great intellectual power, the Baroness von Marenholtz-Bülow, who has given us in her *Recollections of Friedrich Froebel* the only lifelike portrait we possess.

In the great year of revolutions 1848, Froebel had hoped to turn to account the general eagerness for improvement, and Middendorff had presented an address on Kindergartens to the German Parliament. Besides this a nephew of Froebel's published books which were supposed to teach socialism. True, the uncle and nephew differed so widely that the "new Froebelians" were the enemies of "the old." The distinction was overlooked, and Friedrich and Karl Froebel were regarded as the united advocates of some new thing. In the reaction which soon set in Froebel found himself suspected of socialism and irreligion, and in 1851 the "cultus-minister" Raumer issued an edict forbidding the establishment of schools "after Friedrich and Karl Froebel's principles" in Prussia. This was a heavy blow to the old man, who looked to the government of the "*Cultus-staat*" Prussia for support, and was met with denunciation.

The prominence which Froebel gave to action, his doctrine that man is primarily a doer and even a creator, and that he learns only through "self-activity," may produce great changes in educational methods generally, and not simply in the treatment of children too young for schooling. But it was to the first stage of life that Froebel paid the greatest attention, and it is over this stage that his influence is gradually extending. Froebel held with Rousseau that each age has a completeness of its own, and that the perfection of the later stage can be attained only through the perfection of the earlier. If the infant is what he should be as an infant, and the child as a child, he will become what he should be as a boy, just as naturally as new shoots spring from the healthy plant. Every stage, then, must be cared for and tended in such a way that it may attain its own perfection. Impressed with the immense importance of the first stage, Froebel like Pestalozzi devoted himself to the instruction of mothers. But he would not, like Pestalozzi, leave the children entirely in the mother's hands. Pestalozzi held that the child belonged to the family; Fichte, on the other hand, claimed it for society and the state. Froebel, whose mind, like that of Frederick Maurice, delighted in harmonizing apparent contradictions, and who taught that "all progress lay through opposites to their reconciliation," maintained that the child belonged both to the family and to society, and he would therefore have children spend some hours of the day in a common life and in well-organized common employments. These assemblies of children he would not call schools, for the children in them ought not be old enough for schooling. So he invented the name *Kindergarten*, garden of children, and called the superintendents "children's gardeners." He laid great stress on every child cultivating its own plot of ground, but this was not his reason for the choice of the name. It was rather that he thought of these institutions as inclosures in which young human plants are nurtured. In the Kindergarten the children's employment should be play. But any occupation in which children delight is play to them; and Froebel invented a series of employments, which, while they are in this sense play to the children, have nevertheless, as seen from the adult point of view,

a distinct educational object. This object, as Froebel himself describes it, is "to give the children employment in agreement with their whole nature, to strengthen their bodies, to exercise their senses, to engage their awakening mind, and through their senses to bring them acquainted with nature and their fellow creatures; it is especially to guide aright the heart and the affections, and to lead them to the original ground of all life, to unity with themselves."

At the end of nearly forty years since Friedrich Froebel's death, the spread of his ideas, or at least of his methods, seems rapidly extending. Prophets are slowly recognized in their own country, and although he is so thoroughly German in his mode of thought and exposition that, as Deinhardt says, no other nation could have produced such a man, the Germans as yet are not so ready to learn from Froebel as from the Swiss Pestalozzi. In Austria the Kindergarten has made more way than in Prussia, and it prospers in America. But Froebel's influence is not limited to the Kindergarten. His conception of education cannot but affect the thoughts, and ultimately the practice, of all teachers who will be at the pains to understand it.

FROG, the common name of an extensive group of Batrachians forming, along with the toads, the amphibian order *Anoura*. They are divided into nine families, containing ninety-two genera and four hundred and forty species, and are found in all quarters of the globe, being most abundant in the tropical and sub-tropical regions, but also occurring within the arctic circle. Most of the families have a very limited distribution, and only two of them, the true frogs (*Ranidae*), of which there are 150 species, and the *Polypedatidae*, a family of tree-frogs, containing 124 species, can be regarded as almost cosmopolitan. The neotropical, or South American region, is richest in peculiar forms, while it possesses some only found beyond it in the widely remote Australian region; thus the *Polypedatidae*, a family of tree-frogs, is peculiar to the two; the genus *Litoria* is confined to Australia, with the exception of a single species occurring in Paraguay; while the only frog known in New Zealand has its nearest allies in South America. Those regions bear also a negative resemblance in the total absence from both of the genus *Rana*, the sixty species of which are distributed throughout the other quarters of the globe. These facts, among others, have been adduced in support of the theory that at one time the continents of South America and Australia had a land connection. Frogs are almost totally absent from oceanic islands, a single species occurring in New Zealand, and one or two others in the Pacific islands, as far east as the Fijis, beyond which they are unknown. On the assumption that those islands obtained their present fauna from the nearest continental land, the absence of frogs can be readily explained by the fact that salt water is alike fatal to the adult frog and to its spawn, and thus formed an insuperable barrier to their migration.

Frogs, as is shown by their wide distribution, are capable of enduring a considerable degree of both heat and cold; they are, however, altogether intolerant of long-continued drought, a desert forming as certain a barrier to their migration as an ocean. Both during their larval stage and afterward, for the purpose of cutaneous respiration, abundant moisture is a necessity of their existence; consequently, whether they live on the ground or on trees, they are never found far from rivers, marshes or lakes. In winter the frogs of northern climates hibernate, burying themselves in the mud at the bottom of pools, and lying clustered together in a state of complete torpidity. In hot climates they are said to go into a similar condition, known as "æstivation," during periods of exceptional heat and drought, in order



to retard the dissipation of the moisture in their bodies. On reappearing from their long winter sleep, the work of reproduction is at once entered upon, the males making their presence known to the females by the vigorous exercise of their vocal organs. The croaking of the common frog can only be regarded as pleasant from its association with the welcome advent of spring; still more unpleasant, however, is the much louder croak of the edible frog of the continent.

FRÖHLICH, ABRAHAM EMANUEL, a German-Swiss poet, was born 1796, at Brugg, in the canton of Aargau, where his father was a teacher. At the age of fifteen he was sent to study theology in the academy of Zürich. In 1817 he was ordained and returned as teacher to his native town, where he lived for ten years. He was then appointed professor of German language and literature in the canton-school at Aarau, which post he lost, however, in the political quarrels of 1830. He afterward obtained the post of teacher and rector of the Bezirksschule, and was also appointed Hülfsprediger. He died 1865. Fröhllich is best known for his two heroic poems, *Ulrich Zwingli* and *Ulrich von Hutten*, and especially for his fables, which have been ranked with those of Hagedorn, Lessing, and Gellert.

FROISSART, JEAN (1337-1410?). The personal history of Froissart, the circumstances of his birth and education, the incidents of his life, must all be sought in his own verses and chronicles. He possessed in his own lifetime no such fame as that which attended the steps of Petrarch; when he died it did not occur to his successors that a chapter might well be added to his *Chronicle* setting forth what manner of man he was who wrote it. The village of Lestines, where he was curé, has long forgotten that a great writer ever lived there. They cannot point to any house in Valenciennes as the lodging in which he put together his notes and made history out of personal reminiscences. It is not certain when or where he died, or where he was buried. It is fortunate, therefore, that the scattered statements in his writings may be so pieced together as to afford a tolerably connected history of his life year after year. The personality of the man, independently of his adventures, may be arrived at by the same process. It will be found that Froissart, without meaning it, has portrayed himself in clear and well-defined outline.

The date generally adopted for his birth is 1337. In after years Froissart pleased himself by recalling in verse the scenes and pursuits of his childhood. These are presented in vague generalities. There is nothing to show that he was unlike any other boy, and, unfortunately, it did not occur to him that a photograph of a schoolboy's life amid bourgeois surroundings would be to posterity quite as interesting as that faithful portraiture of courts and knights which he has drawn up in his *Chronicle*. In any case he was born in a place, as well as at a time, singularly adapted to fill the brain of an imaginative boy. Valenciennes, at the present day a dull town, was then a city extremely rich in romantic associations. The castle of Valenciennes was illustrious in the romance of *Perceforest*: there was born that most glorious and most luckless hero, Baldwin, first emperor of Constantinople. All the splendor of mediæval life was to be seen in Froissart's native city; on the walls of the Salle le Comte glittered—perhaps painted by his father—the arms and scutcheons beneath the banners and helmets of Luxembourg, Hainault, and Avesnes; the streets were crowded with knights and soldiers, priests, artisans, and merchants; the churches were rich with stained glass, delicate tracery, and precious carving; there were libraries full of richly illuminated manuscripts on which the boy could gaze with delight; every year there was the *fête* of the *puy*

*d'Amour de Valenciennes*, at which he would hear the verses of the competing poets; there were festivals, masques, mummeries, and moralities. The eyes of the boy were turned upon the castle and not upon the town; it was the splendor of the knights which dazzled him, insomuch that he regarded and continued ever afterward to regard a prince gallant in the field, glittering of apparel, lavish of largesse, as almost a god.

The moon, he says, rules the first four years of life; Mercury the next ten; Venus follows. He was fourteen when the last goddess appeared to him in person, as he tells us, after the manner of his time, and informed him that he was to love a lady, "belle, jone, et gente." Awaiting this happy event, he began to consider how best to earn his livelihood. They first placed him in some commercial position—impossible now to say of what kind—which he simply calls "la marchandise." He very soon abandoned it and resolved on becoming a learned clerk. He then naturally began to make verses, like every other learned clerk. Quite as naturally, and still in the character of a learned clerk, he fulfilled the prophecy of Venus, and fell in love. He found one day a demoiselle reading a book of romances. He did not know who she was, but stealing gently toward her, he asked her what book she was reading. It was the romance of *Cleomades*. He remarks the singular beauty of her blue eyes and fair hair, while she reads a page or two, and then he was at once provided with that essential for soldier, knight, or poet, a mistress—one for whom he could write verses. She was rich and he was poor; she was nobly born and he obscure; it was long before she would accept the devotion, even of the conventional kind which Froissart offered her, and which would in no way interfere with the practical business of her life. And in this hopeless way, the passion of the young poet remaining the same, and the coldness of the lady being unaltered, the course of this passion ran on for some time. Nor was it until the day of Froissart's departure from his native town that she gave him an interview and spoke kindly to him, even promising, with tears in her eyes, that "Doulce Pensée" would assure him that she would have no joyous day until she should see him again.

He was eighteen years of age, he had learned all that he wanted to learn; he possessed the mechanical art of verse; he had read the slender stock of classical literature accessible; he longed to see the world. He must already have acquired some distinction, because, on setting out for the court of England, he was able to take with him letters of recommendation from the king of Bohemia and the count of Hainault to Queen Philippa, niece of the latter. He was well received by the queen, always ready to welcome her own countrymen; he wrote ballads and virelays for her and her ladies. But after a year he began to pine for another sight of "la très douce, simple, et quoie," whom he loved loyally. Good Queen Philippa, perceiving his altered looks and guessing the cause, made him confess that he was in love and longed to see his mistress. She gave him his *congé* on the condition that he was to return. It is clear that the young clerk had already learned to ingratiate himself with princes.

The conclusion of his single love adventure is simply and unaffectedly told in his *Trettie de l'Espinet Amoureuse*. It was a passion conducted on the well-known lines of conventional love; the pair exchanged violets and roses, the lady accepted ballads; Froissart became either openly or in secret her recognized lover, a mere title of honor, which conferred distinction on her who bestowed it, as well as upon him who received it. But the progress of the amour was rudely interrupted by the arts of "Malebouche," or Calumny. The story, what-



ever it was, that Malebouche whispered in the ear of the lady, led to a complete rupture. The *damoiselle* not only scornfully refused to speak to her lover or acknowledge him, but even seized him by the hair and pulled out a handful. Nor would she ever be reconciled to him again. Years afterward, when Froissart writes the story of his one love passage, he shows that he still takes delight in the remembrance of her, loves to draw her portrait, and lingers with fondness over the thought of what she once was to him.

Perhaps to get healed of his sorrow, Froissart began those wanderings in which the best part of his life was to be consumed. He first visited Avignon, perhaps to ask for a benefice, perhaps as the bearer of a message from the bishop of Cambray to pope or cardinal. It was in the year 1360, and in the pontificate of Innocent VI. From the papal city he seems to have gone to Paris, perhaps charged with a diplomatic mission. In 1361 he returned to England after an absence of five years. The queen made young Froissart one of her secretaries, and he began to serve her with "*beaux ditiés et traités amoureux*."

Froissart would probably have been content to go on living at ease in this congenial atmosphere of flattery, praise, and caresses, pouring out his *virelays* and *chansons* according to demand with facile monotony, but for the instigation of Queen Philippa, who seems to have suggested to him the propriety of traveling in order to get information for more rhymed chronicles. It was at her charges that Froissart made his first serious journey. He seems to have traveled a great part of the way alone, or accompanied only by his servants, for he was fain to beguile the journey by composing an imaginary conversation in verse between his horse and his hound. This may be found among his published poems, but it does not repay perusal. In Scotland he met with a favorable reception, not only from King David but from William of Douglas, and from the earls of Fife, Mar, March and others. The souvenirs of this journey are found scattered about in the chronicles. His travels in Scotland lasted six months. Returning southward he rode along the whole course of the Roman wall, a thing alone sufficient to show that he possessed the true spirit of an archæologist; he thought that Carlisle was Carlyon, and congratulated himself on having found King Arthur's capital; he calls Westmoreland, where the common people still spoke the ancient British tongue, North Wales; he rode down the banks of the Severn, and returned to London by way of Oxford.

In London Froissart entered into the service of King John of France as secretary, and grew daily more courtly, more in favor with princes and great ladies. He probably acquired at this period that art, in which he has probably never been surpassed, of making people tell him all they knew. No newspaper correspondent, no American interviewer, has ever equaled this mediæval collector of intelligence. From Queen Philippa, who confided to him the tender story of her youthful and lasting love for her great husband, down to the simplest knight—Froissart conversed with none beneath the rank of gentlemen—all united in telling this man what he wanted to know. He wanted to know everything; he liked the story of a battle from both sides and from many points of view; he wanted the details of every little cavalry skirmish, every capture of a castle, every gallant action and brave deed. And, what was more remarkable, he forgot nothing.

While he was on a tour through Italy he received at Rome the news of the death of his patron, Queen Philippa.

Philippa dead, Froissart looked around for a new

patron. Then he hastened back to his own country and presented himself, with a new book in French, to the duchess of Brabant. Froissart may also have found a patron in Yolande de Bar, grandmother of King René of Anjou. In any case he received a substantial gift from some one in the shape of the benefice of Lestines, a village some three or four miles from the town of Binche. Also, in addition to his cure, he got placed upon the duke of Brabant's pension list, and was entitled to a yearly grant of grain and wine, with some small sum in money.

It is clear, from Froissart's own account of himself, that he was by no means a man who would at the age of four or five and thirty be contented to sit down at ease to discharge the duties of parish priest, to say mass, to bury the dead, to marry the villagers, and to baptize the young. In these days, and in that country, it does not seem that other duties were expected. Preaching was not required, godliness of life, piety, good works, and the graces of a modern ecclesiastic were not looked for. Therefore, when Froissart complains to himself that the taverns of Lestines got 500 francs of his money, we need not at once set him down as either a bad priest, or exceptionally given to drink. The people of the place were greatly addicted to wine; the *taverniers de Lestines* proverbially sold good wine and the Flemings were proverbially of a joyous disposition. Froissart, the parish priest of courtly manners, no doubt drank with the rest, and listened if they sang his own, not the coarse country songs. And then came Gui de Blois, one of King John's hostages in London in the old days. He had been fighting in Prussia with the Teutonic knights, and now, a little tired of war, proposed to settle down for a time in his castle of Beaumont. This prince was a member of the great house of Chatillon. He was count of Blois, of Soissons, and of Chimay. He had now, about the year 1374, an excellent reputation as a good captain. In him Froissart, who hastened to resume acquaintance, found a new patron. More than that, it was this sire de Beaumont, in emulation of his grandfather, the patron of Jean le Bel, who advised Froissart seriously to take in hand the history of his own time. Froissart was then in his thirty-sixth year. For twenty years he had been rhyming, for eighteen he had been making verses for queens and ladies. Yet during all this time he had been accumulating in his retentive brain the materials for his future work.

He began by editing, so to speak, that is, by rewriting with additions the work of Jean le Bel; Gui de Blois, among others, supplied him with additional information. His own notes, taken from information obtained in his travels, gave him more details, and when in 1374 Gui married Marie de Namur, Froissart found in the bride's father, Robert de Namur, one who had himself largely shared in the events which he had to relate. He, for instance, is the authority for the story of the siege of Calais and the six burgesses. Provided with these materials, Froissart remained at Lestines, or at Beaumont, arranging and writing his chronicles. During this period, too, he composed his *Espinette Amoureux*, and the *Joli Buisson de Jonesce*, and his romance of *Méliador*. He also became chaplain to the count of Blois, and obtained a canonry of Chimay. After this appointment we hear nothing more of Lestines, which he probably resigned.

In these quiet pursuits he passed twelve years, years of which we hear nothing, probably because there was nothing to tell. In 1386 his travels began again, when he accompanied Gui to his castle at Blois, in order to celebrate the marriage of his son Louis de Dunois with Marie de Berry. He wrote a *pastourelle* in honor of



the event. Then he attached himself for a few days to the duke of Berry, from whom he learned certain particulars of current events, and then becoming aware of what promised to be the most mighty feat of arms of his time, he hastened to Sluys in order to be on the spot. At this port the French were collecting an enormous fleet, and making preparations of the greatest magnitude in order to repeat the invasion of William the Conqueror. They were tired of being invaded by the English, and wished to turn the tables. The talk was all of conquering the country and dividing it among the knights, as had been done by the Normans. It is not clear whether Froissart intended to go over with the invaders; but as his sympathies are ever with the side where he happens to be, he exhausts himself in admiration of this grand gathering of ships and men. But the delays of the duke of Berry, and the arrival of bad weather, spoiled everything. There was no invasion of England. In Flanders Froissart met many knights who had fought at Rosebeque, and could tell him of the troubles which in a few years desolated that country, once so prosperous. He set himself to ascertain the history with as much accuracy as the comparison of various accounts by eye witnesses and actors would allow. He stayed at Ghent, among those ruined merchants and mechanics, for whom, as one of the same class, he felt a sympathy never extended to English or French, perhaps quite as unfortunate; and he devotes no fewer than 300 chapters to the Flemish troubles, an amount out of all proportion to the comparative importance of the events. This portion of the chronicle was written at Valenciennes.

This part of his work finished, he considered what to do next. There was small chance of anything important happening in Picardy or Hainault, and he determined on making a journey to the south of France in order to learn something new.

On this occasion he rode first to Blois; on the way he fell in with two knights who told him of the disasters of the English army in Spain; one of them also informed him of the splendid hospitalities and generosity of Gaston Phœbus, count of Foix, on hearing of which, Froissart resolved to seek him out. He avoided the English provinces of Poitou and Guienne, and rode southward through Berry, Auvergne and Languedoc. Arrived at Foix, he discovered that the count was at Orthez, whither he proceeded in company with a knight named Espaing de Lyon, who, Froissart found, had not only fought but could describe. Arrived at length at Orthez, Froissart lost no time in presenting his credentials to the count of Foix. Mindful, no doubt, of those paid clerks who were always writing verses, Froissart introduced himself as a chronicler. He could, of course, rhyme, and in proof he brought with him his romance of *Meliador*; but he did not present himself as a wandering poet. The count received him graciously, and speedily discovered the good qualities of his guest.

Leaving Gaston at length, Froissart assisted at the wedding of the old duke of Berry with the youthful Jeanne de Bourbon, and was present at the grand reception given to Isabeau of Bavaria by the Parisians. He then returned to Valenciennes, and sat down to write his fourth book. He next made his last visit to England, where, after forty years' absence, he naturally found no one who remembered him. Here he gave King Richard a copy of his "traités amoureux," and got favor at court. He stayed in England some months, seeking information on all points from his friends, Henry Chrystead and Richard Stury, from the dukes of York and Gloucester, and from Robert the Hermit. The rest is vague tradition. He is said to have died at Chimay; it is further said that he died in poverty so

great that his relations could not even afford to carve his name upon the headstone of his tomb.

FROME, a parliamentary borough and market town of Somersetshire, is situated on the small river Frome, an affluent of the Avon, eleven miles south of Bath.

FROMENTIN, EUGENE (1820-76), French painter, was born at La Rochelle. His works are distinguished by striking composition, great dexterity of handling, and brilliancy of color. In them is given with great truth and refinement the unconscious grandeur of barbarian and animal attitudes and gestures. He died at La Rochelle.

FROND, in botany, a term often used to designate the leaves of cryptogamous plants. It was originally introduced as distinctive of organs in which the functions of stem and leaf are combined, and was applied to the leaves of palms, etc. The term *leaf* is now very generally used, even as to mosses, ferns, etc., and the term *thallus* is employed as to lichens. In the case of many *Algæ*, the term frond is often used to designate the whole plant, except its organs of reproduction.

FRONDE, WAR OF THE (1648-52). See CONDE.

FRONTINUS, SEXTUS JULIUS, a Roman soldier, and the author of some interesting works, was born of a patrician family at Rome, about 40 A.D. Nothing is known of his early life or history till we find him acting as *prætor urbanus*, under Vespasian, in 70, an office from which he soon retired to make way for Domitian. Five years later he was sent into Britain to succeed Petilius Cerealis as governor of that island. He subdued the Silures, and held the other native tribes in check till 78, when he was succeeded by Agricola. In 79 he was appointed *curator aquarum* at Rome, an office which was never conferred except upon persons of very high standing. He was also a member of the college of augurs, retaining the dignity till his death, which appears to have happened about 103.

FRONTO, MARCUS CORNELIUS, a Roman grammarian, rhetorician and advocate, was born of an Italian family at Cirta, in Numidia, a Libyan of the Libyans, as he calls himself. The date of his birth is unknown, but as he was quæstor in 133, it must have been before 113, and not improbably between 100 and 110. He came to Rome in the reign of Hadrian, and soon gained such renown as an advocate and orator as to be reckoned inferior only to Cicero.

FROSINONE, a town of Italy, in the province of Rome, on the railway between Rome and Naples, about sixty-two miles from the former and 104 from the latter.

FROST, WILLIAM EDWARD (1810-77), a painter of mythological and fanciful subjects, was born at Wandswoth, near London.

FROSTBITE. See MORTIFICATION.

FROSTBURG, a growing Maryland town, situated in Alleghany county. It has railroad, banking and telegraph facilities, and a population (1890) of 5,500.

FRUGONI, CARLO INNOCENZO (1692-1768), an Italian poet, was born at Genoa. Frugoni holds a place in the first rank of the lyrical poets of his time, and his other compositions, which embrace almost every form of poetry, have in most cases considerable merit, and are generally characterized by harmony of versification, elegance of language, and appositeness and great variety of imagery.

FRUIT (*fructus*), in the botanical use of the term, in phanerogamous plants, is a mature ovary containing a seed or seeds; and in cryptogamous plants, a spore-case (*sporangium* or *theca*) containing spores. Other parts of the flower, most frequently the calyx, sometimes remain after flowering is over, undergo a further development, become incorporated with the ovary, and form



part of the fruit. The development of the fruit in phanerogamous plants depends upon the fertilization of the ovules. For the various forms of fruits, see Balfour's or Henfrey's *Manual of Botany*; and for classification see Dickson's *Journal of Botany*, October, 1871. All that is external to the proper integuments of the seed in the ripe fruit is called the *pericarp*; and this, which varies extremely in size and other characters, usually consists of three layers, the outermost of which is called the *epicarp*; the middle one, the *mesocarp*, or sometimes the *sarcocarp*; and the innermost, the *endocarp*. A classification of the different kinds of fruits is extremely difficult, although they afford characters of great importance in descriptive and systematic botany. A convenient primary division of fruits is into those which are formed from one flower, and those which are formed by incorporation of the ovaries of many flowers. The production of ripe fruit is exhaustive to the energies of a plant, and plants ordinarily annual may be preserved in life for several years by preventing it. Very young fruit trees generally fail to bring fruit to perfection, and the first flowers of melons and gourds are often, for a similar reason, abortive; while, on the contrary, any circumstance that favors an accumulation of sap in a particular season tends to render fruit trees unusually productive in the next, as when the whole blossoms of a year are killed by frost, or when, from the coldness of the previous summer, flower-buds have not been formed in abundance. The value of fruits to man sometimes, as in the corn plants, chiefly depends on the farinaceous matter of their seeds, containing starch, gluten, etc.; sometimes, as in the banana and bread-fruit, on the starchy matter of the pulpy part; sometimes, as in nuts, on fixed oils; sometimes, as in many succulent fruits, on sugar and various acids, with gum, pectine, etc., and for peculiar principles capable of application to medicinal and other uses, or making them capable of being used as condiments, perfumes, etc. Coffee, cocoa, pepper, vanilla, and many other articles of commerce are obtained from fruits.

FRUMENTIUS, an early Christian missionary and bishop, who is recognized by the Abyssinian church as its apostle and founder, and usually bears in Abyssinian literature the title of Abba Salama, or Father of Salvation. He was consecrated bishop by Athanasius of Alexandria in 326 A.D., and returned to propagate Christianity among the natives.

FRUMENTY, or FURMETY (Lat. *frumentum*, "wheat"), an English dish made of whole wheat or rice boiled in milk and seasoned.

FRUNDSBERG, GEORG VON, the great leader of the German landsknechte during the Italian wars of the emperors Maximilian and Charles V., was born in 1473 at Mindelheim in Swabia, and there he died in 1528. He fought in twenty pitched battles, besides sieges and skirmishes without number; and the victory of Pavia (1525) was largely due to him. Two years later he was marching on Rome with the Constable de Bourbon, when a mutiny of his soldiers brought on a stroke of apoplexy. See monographs by Barthold (1833), and Heilmann (1868).

FRUSTUM, in geometry, is the part of a solid next the base, left on cutting off the top by a plane parallel to the base. The frustrum of a sphere or spheroid, however, is any part of these solids comprised between two circular sections; and the *middle* frustrum of a sphere is that whose ends are equal circles, having the center of the sphere in the middle of it, and equally distant from both ends.

FRUYTIERS, PHILIP, a pupil of the Jesuits' college at Antwerp in 1627, entered the Antwerp guild of painters, without a fee, in 1631. He is described in the

register of that institution as "illuminator, painter and engraver." Unhappily no undoubted production of his hand has been preserved, and hence we are at a loss to surely gauge his acquirements. He died in 1666.

FRY, or GURNEY, ELIZABETH (1780-1845), an eminent philanthropist, and, after Howard, the chief promoter of prison reform in Europe, was born in Norwich. In August, 1800, she became the wife of Joseph Fry, a London merchant. Although she had made several visits to Newgate prison as early as February, 1813, it was not until nearly four years afterward that the great public work of her life may be said to have begun. The "Association for the Improvement of the Female Prisoners in Newgate," was formed in April, 1817. Its aim was the much-needed establishment of some of what are now regarded as the first principles of prison-discipline, such as entire separation of the sexes, classification of criminals, female supervision for the women, and adequate provision for their religious and secular instruction, as also for their useful employment. The ameliorations effected by this association, and largely by the personal exertions of Mrs. Fry, soon became obvious, and led to a rapid extension of similar methods to other places. In 1842, through failing health, Mrs. Fry was compelled to forego her plans for a still more widely extended activity, but had the satisfaction of hearing from almost every quarter of Europe that the authorities were giving increased practical effect to her suggestions. In 1844 she was seized with a lingering illness of which she died on October 12, 1845. She was survived by a numerous family, the youngest of whom was born in 1822.

FUAD PASHA, MEHMED (1814-1869), a Turkish statesman and author, was born at Constantinople. In 1867 he accompanied the sultan to England and France. He died at Nice, whither he had gone for the benefit of his health. Fuad Pasha was one of the first members of the Turkish Imperial Academy of Sciences and Belles-lettres, founded in 1851. He is the author of a poem entitled *Alhambra*, written after his sojourn in Spain, and of a Turkish grammar. The suave and genial manners of Fuad Pasha, and his diplomatic talents, stood Turkey in good stead in connection with the Crimean war and the various negotiations in reference to Turkey's relation to her Christian subjects, and helped to inspire a faith in her capacity for reforms, which later events have shown to have been largely misplaced. He endeavored to secure to his country the material advantages to be derived from the adoption of European improvements, but his measures effected no lasting reform in her administration; and by the adoption of a heedless system of credit, he largely increased her financial difficulties.

FUCHS, JOHANN JOSEPH. See FUX.

FUCHS, JOHANN NEPOMUK VON, an eminent chemist and mineralogist, was born at Mattenzell, near Bremberg, in the neighborhood of the Baierischer Wald, May 15, 1774. Having acquired a knowledge of medicine at Vienna and Heidelberg, he in 1801 turned his attention to chemistry and mineralogy, which he studied at Freiberg, Berlin and Paris. Mineralogy and inorganic chemistry are indebted to Fuchs for numerous researches. He is more especially known for his discovery, in 1823, of a process for making a soluble glass, used for fixing fresco colors, according to the method termed stereochromy.

FUCHS, LEONHARD (1501-1566), a celebrated German physician, and one of the fathers of scientific botany, was born at Wemdingen in Bavaria.

FUCHSIA, so named by Plumier in honor of the botanist Leonhard Fuchs, a genus of plants of the natural order *Onagraceæ*, characterized by entire, usually



opposite leaves; pendant flowers; a funnel-shaped, brightly colored, quadripartite, deciduous calyx; four petals, alternating with the calycine segments; eight, rarely ten, exserted stamens; a long and filiform style, and inferior ovary; and fleshy, ovoid, many-seeded berries or fruit. All the members of the genus, with the exception of the New Zealand species, are natives of Central and South America—occurring in the interior of forests, or in damp and shady mountainous situations. The various species differ not a little in size as well as in other characters; some being dwarf shrubs; others, as *F. aborescens* and *F. apetala*, attaining a height of twelve to sixteen feet, and having stems several inches in diameter.

**FUEL.** This term includes all substances that may be usefully employed for the production of heat by combustion with atmospheric air or oxygen. Any element or combination of elements susceptible of oxidation, *i.e.*, any substance electro-positive to oxygen, may under particular conditions be made to burn; but only those that ignite by a moderate preliminary heating, and burn with comparative rapidity, and, what is practically of equal importance, are obtainable in quantity and at a moderate price, come fairly within the category of fuels. Among elementary substances only hydrogen, sulphur, carbon, silicon and phosphorus can be so classed, and of these the last two are only of special application. More important than the elements are, however, the carbohydrates, or compounds of carbon, hydrogen and oxygen, which form the bulk of the natural fuels, wood, peat and coal, as well as of their liquid and gaseous derivatives, coal gas, coal tar, pitch, oil, etc., which are possessed of great fuel value. Carbon in the elementary form has its nearest representatives in charcoal and coke.

**FUENTE DE CANTOS**, a town of Spain in the province of Badajoz, and midway between the cities of Badajoz and Seville.

**FUENTE DEL MAESTRE**, a town of Spain in the province of Badajoz, about twenty-five miles south-south-west of Merida.

**FUENTERRABIA**, an ancient town and frontier fortress of Spain, in the province of Guipúzcoa and bishopric of Pamplona.

**FUERO.** The Castilian use of this Latin word (forum) in the sense of a right, privilege, or charter is most probably to be traced to the Roman *conventus iuridici*, otherwise known as *iurisdictiones*, or *fora*, which in Pliny's time were already numerous in the Iberian peninsula. In each of these provincial *fora* the Roman magistrate, as is well known, was accustomed to pay all possible deference to the previously established common law of the district; and it was the privilege of every free subject to demand that he should be judged in accordance with the customs and usages of his proper forum. This was especially true in the case of the inhabitants of those towns which were in possession of the *jus italicum*. It is not, indeed, demonstrable, but there are many presumptions, besides some fragments of direct evidence, which make it more than probable, that the old administrative arrangements both of the provinces and of the towns, but especially of the latter, remained practically undisturbed at the period of the Gothic occupation of Spain.

**FUGGER**, the name of a Swabian family which, by remarkable energy in industry and commerce, acquired enormous wealth, and rose to high rank in the state. The founder of the family was John Fugger, a respectable master weaver at Graben, near Augsburg. His eldest son, John, associated trade in linen with weaving in Augsburg, of which he became a citizen by marriage in 1370. Here he rose to an honorable position,

being one of the twelve councilors of the guild of weavers, and an assessor of the Fehmgericht, the much dreaded secret tribunal of Westphalia. He died in 1409, leaving a fortune of 3,000 florins. From that date to the present time members of the family have occupied positions of trust, at various intervals furnishing the sinews of war for their sovereigns and receiving therefor honors and privileges which have raised them to their present station.

**FUH-CHOW**, more usually Foo-CHOW, a city of China, capital of the province of Fuh-keen, and one of the principal ports open to foreign commerce. In the local dialect it is called Hokchin. It is situated on the river Min, about thirty-five miles from the sea, one hundred and forty miles north of Amoy and two hundred and eighty south of Hang-Chow. The city proper, lying nearly three miles from the north bank of the river, is surrounded by a wall about thirty feet high and twelve feet thick, which makes a circuit of upward of five miles, and is pierced by seven gateways surrounded by tall fantastic watch-towers. The most remarkable establishment of Fuh-Chow is the arsenal situated about three miles down the stream at Pagoda Island, where the sea-going vessels usually anchor. It was founded in 1867, and is conducted under the direction of French engineers according to European methods. The port was opened to European commerce in 1842; and in 1853 the firm of Russell & Co. shipped the first cargoes of tea from Fuh-Chow to Europe and America. A large trade is carried on by the native merchants in timber, paper, woolen and cotton goods, oranges and olives; but the foreign houses mainly confine themselves to opium and tea. The population of Fuh-Chow is stated at 600,000.

**FÜHRICH, JOSEPH VON**, a painter and contemporary of Cornelius and Overbeck, was born at Kratzau, in Bohemia, in 1800. Führich's fame extended far beyond the walls of the Austrian capital; and there are few in Germany who are not acquainted with his illustrations to Tieck's *Genofeva*, the Lord's Prayer, the Triumph of Christ, the Road to Bethlehem, the Succession of Christ according to Thomas à Kempis, the Prodigal Son, and the verses of the Psalter. He died on March 13, 1876.

**FULDA.** The monastery of Fulda occupies the place in the ecclesiastical history of mid Germany, which Monte Cassino holds in Italy, St. Galle in south Germany, Corvey in north Germany, Tours in France, and Iona in Scotland. It was the center of a missionary work, both of conversion and reformation, organized on monastic principles. The monastery of Fulda was only one of several founded by Boniface, the so-called "apostle of Germany," but it was specially favored by its founder, who selected it for his burying place, and it was by far the most important. Fulda became the parent of many other missionary monasteries, the most famous of these being Hirsgau in Swabia. In 968 the abbot of Fulda was recognized as primate of the other abbeys of Germany; but wealth and power brought corruption. In the beginning of the eleventh century, the monastery had to be reformed, and this was done by turning out the old monks, bringing a number of new ones from Scotland, and reestablishing in all its strictness the old Benedictine rule.

**FULHAM**, a suburb of London, in the county of Middlesex, is situated on the Thames, five and one-half miles southwest of St. Paul's, and opposite Putney, with which it is connected by a curious old wooden bridge erected in 1729.

**FULLER, ANDREW (1754-1815)**, a distinguished preacher and theological writer of the Baptist denomination, was born at Wicken, in Cambridgeshire.



FULLER, SARAH MARGARET. See OSSOLI.

FULLER, THOMAS, the witty divine and historian, eldest son of a father of the same name who was rector of Aldwinckle St. Peter's, Northamptonshire, was born at the rectory house of that country parish in the year 1608. At an early age he was admitted to Queen's College, Cambridge, then presided over by Dr. John Davenant. He was apt and quick in study; and in Lent 1624-5 he became B.A., and in July, 1628, M.A. In 1630 he received from Corpus Christi College, in the same university, the curacy of St. Benet's, which he held for a short time, and where he had for a parishioner the celebrated carrier Hobson. Fuller's quaint and humorous oratory, as displayed in his sermons on Ruth, soon attracted attention. His first published volume of sermons appeared in 1640 under the title of *Joseph's parti-colored Coat*, quarto, which contains many of his quaint utterances and odd conceits. His grosser mannerisms of style, derived from the divines of the former generation, disappeared for the most part in his subsequent discourses.

A sermon preached on church reformation, satirizing the religious reformers, and maintaining that only the Supreme Power could initiate reforms, aroused a storm in the metropolis, then well-nigh abandoned by the active royalists, and brought about Fuller's secret flight to Oxford, and the loss of all his preferments and property. He lived in a hired chamber at Lincoln College for seventeen weeks. Thence he put forth a witty and effective reply to John Saltmarsh, who had attacked his views on ecclesiastical reform. Fuller subsequently published, by royal request, a fast sermon preached May 10, 1644, at St. Mary's, Oxford, before the king and prince Charles, called *Jacob's Vow*. In this discourse, which, it is supposed, had relation to the king's proposed restoration of the church lands, the preacher referred to some religious exercise then being observed every Tuesday by Charles I., all record of which has been omitted in the pages of history. The spirit of Fuller's preaching, always characterized by calmness and moderation, gave offense to the high royalists, who charged him with lukewarmness in their cause. To silence unjust censures, he became chaplain to the regiment of the excellent Lord Hopton. After the defeat of Hopton at Cheriton Down, Fuller retreated to Basing House. He took an active part in its defense, and was once incited by the noise of the enemy's artillery, which disturbed him at his books, to head a sally upon the trenches. His life with the troops caused him to be afterward regarded as one of "the great cavalier parsons." In his marches with his regiment round about Oxford, and in the west, he devoted much time to the collection of details, from churches, old buildings, and the conversation of ancient gossips, for his *Church History* and *Worthies of England*. His patriotism in the national crisis was evidenced in many ways. For the soldiers and the more religious of the royalist party he compiled, 1645, a small volume of prayers and meditations—the *Good Thoughts in Bad Times*—which, set up and printed in the besieged city of Exeter, whither he had retired, was called by himself "the first fruits of Exeter press." It was inscribed to Lady Dalkeith, governess to the infant princess, Henrietta Anne, who was born at Exeter, June 16, 1644. Fuller was, by the king, placed in the household of the princess through the influence of Lady Dalkeith. In this city, as elsewhere, he attracted to himself a circle of friends. The corporation gave him the Bodleian lectureship, and he held it until after the surrender of the city to the Parliament. *The Fear of Losing the Old Light* was his farewell discourse to his Exeter friends. Under the Articles of Surrender, Fuller made his composition

with the government at London, his "delinquency" being that he had been present in the king's garrisons. In a characteristic petition to compound, dated June 1, 1646, he acquainted the committee that he was then lodging at "the Crown" in St. Paul's church-yard (the sign of his bookseller, Williams); and the word *Crown* is written in large letters and designedly falls in the center of the document, in which, moreover, there are traces of the disagreeable position in which he was placed. In a life of Andronicus, 1646, partly authentic and partly fictitious, he satirized the leaders of the revolution; and more than one edition of this little book was called for. For the comfort of sufferers by the war he issued, 1647, a second devotional manual, entitled *Good Thoughts in Worse Times*, abounding like its predecessor and its successor, in fervent aspirations, and drawing moral lessons in beautiful language out of the events of his life, or the circumstances of the time. In grief over his losses, which included his library and manuscripts, and over the calamities of the country, he wrote his work on the *Wounded Conscience*, 1647. Under the countenance of citizens whose names are perpetuated in the dedications in his books, Fuller, in 1647, began to preach at St. Clement's, East Cheap, and elsewhere, in the capacity of lecturer. While at St. Clement's he was suspended; but speedily recovering his freedom, he preached wherever he was invited. Among Fuller's noble patrons was the earl of Carlisle, who made him his chaplain, and presented him to the curacy of Waltham Abbey. His possession of the living was in jeopardy on the appointment of Cromwell's "Tryers;" but he evaded the inquisitorial questions of that dreaded body by his ready wit. Nor was Fuller disturbed at Waltham in the "dangerous year" 1655, when the Protector's edict prohibited the adherents of the late king from preaching. Moreover, Lionel, third earl of Middlesex, who lived in the parish, gave him what remained of the books of the lord treasurer his father; and through the good offices of the marchioness of Hertford, part of his own pillaged library was restored to him. Under such circumstances Fuller actively prosecuted his literary labors, producing successively, at great cost, his survey of the Holy Land called *A Pisgah-Sight of Palestine*, 1650; and his *Church-History of Britain*, 1655, from the birth of Jesus Christ until the year 1648. His last and best patron was the Hon. George Berkeley of Cranford House, Middlesex, whose chaplain he was, and who gave him Cranford rectory, 1658. To this nobleman Fuller's reply to Heylin, called *The Appeal of Injured Innocence*, 1659, was inscribed. This remarkable and instructive book embraces, as its editor, Mr. James Nichols, has remarked, "almost every topic within the range of human disquisition, from the most sublime mysteries of the Christian religion, and the great antiquity of the Hebrew and Welsh languages, down to *The Tale of a Tub*, and criticisms on Shakespeare's perversion of the character of Sir John Falstaff." The only other important works issued by Fuller in his lifetime were connected with the Restoration. The revived Long Parliament, December, 1659, proposed an oath of fealty to the Commonwealth, and the abjuration of Charles II. and his family. The matter was much debated; and in an able letter published in February 1660, which went into a third edition, called *An Alarum to the Counties of England and Wales*, Fuller discussed the proposal. His arguments tended to swell the cry for a free and full parliament—free from force, as he expressed it, as well as from abjurations or previous engagements. In anticipation of the meeting of the new parliament, April 25th, and as if foreseeing the unwise attitude of those in power in relation to the



reaction, Fuller put forth his *Mixt Contemplations in a Better Times*, 1660, dedicated to Lady Monk. There is good reason to suppose that Fuller was at the Hague immediately before the Restoration, in the retinue of Lord Berkeley, one of the commissioners of the House of Lords, whose last service to his friend was to interest himself in obtaining him a bishopric. A *Panegyrick to His Majesty on his Happy Return* was the last of Fuller's verse-efforts. On August 2d, by royal letters, he was admitted D.D. at Cambridge, as a scholar of integrity and good learning, who had been hindered in the due way of proceeding to his degree. His former preferments were restored to him. At the Savoy Pepys heard him preach; but he preferred his conversation or his books to his sermons. Fuller's last promotion was that of chaplain in extraordinary to Charles II. In the summer of 1661 he visited the west in connection with the business of his prebend, and upon his return he was seized with a kind of typhus-fever called the "new disease." On Sunday, August 12th, while preaching a marriage sermon at the Savoy, he was disabled from proceeding; and at the close of the service he was carried home in a sedan to his new lodgings in Covent Garden, where he expired, Thursday, August 16th, aged fifty-four.

FULLER'S EARTH, so named from its use by fullers as an absorbent of the grease and oil of cloth, is an earthy hydrated silicate of aluminium.

FULMAR, from the Gaelic *Fulmaire*, the *Fulmarus glacialis* of modern ornithologists, one of the largest of the Petrels of the northern hemisphere, being about the size of the Common Gull and not unlike it in general coloration, except that its primaries are gray instead of black. This bird, which ranges over the North Atlantic, is seldom seen on the European side.

FULTON, ROBERT (1765-1815), an American engineer and mechanic, was born in 1765 at Little Britain in Pennsylvania. At the age of seventeen he adopted the profession of a portrait and landscape painter, but he also, even then, devoted a considerable portion of his time to mechanical pursuits.

Fulton invented various machines and improvements upon machines, flax-spinners, rope-twisters, canal-locks, and was continually occupied thus until 1793, when, rightly impressed with the future importance of steam navigation to American commerce, he turned his attention to that subject. That which seems so very commonplace now was then a task not considered practically possible. Fulton had made many failures, once after having had \$5,000 voted him by congress for experimenting upon a sub-marine torpedo. Steam navigation had been tried, but in all cases had practically failed. This man's merit rests upon persistence in trying until impossibility is demonstrated.

After importing engines from Europe to use in his experiment, Fulton's steamboat, the *Clermont*, made the trial trip to Albany in thirty-six hours. It was exceedingly slow, and very imperfect, but it was capable of making a journey in that time which had previously required seven to ten days. It established a fact that has been growing ever since, and is of inestimable value.

There are now no details of construction and cost of this first steamboat extant, and they are entirely unimportant. Fulton left a written description of the trial, which is often quoted. Of the supposed drawings of the *Clermont* no two are alike. In immediately succeeding improvements, original details were forgotten. The boat was probably propelled by a beam-engine, with the paddle-wheels uninclosed, and was probably also equipped with sails.

Fulton afterwards constructed many other steam

vessels, among them, in 1814, the first steam war-vessel ever built by the United States. But the patent-office was then in its infancy, and he failed to secure adequate protection upon his inventions. He died February 24, 1815, probably unconscious of the far-reaching results on the rivers of the United States that his achievement would bring about.

FULMINATE OF MERCURY, or FULMINATING MERCURY ( $\text{HgC}_2\text{N}_2\text{O}_2$ ), is best prepared by dissolving 3 parts of mercury in 36 of nitric acid of specific gravity 1.34, without the application of heat in a flask capable of holding eighteen times the bulk of the acid. The solution is then to be poured into a large vessel containing 17 parts of alcohol of specific gravity 0.830, and immediately to be retransferred to the flask, which is still full of nitrous vapors, and with which it must be well shaken, in order to effect their absorption. Effervescence commences in a few minutes, and soon becomes extremely violent; and at the same time there is a deposit of metallic mercury, which is gradually redissolved. The reaction must be moderated by the gradual addition of 17 parts more of alcohol; and on cooling, crystals of the fulminate, amounting to 4.6 parts, are deposited. These must be washed with cold water, and dried at  $100^\circ \text{F}$ . Fulminate of mercury forms white, silky needles. It may be handled without much danger when moist; but when dry, it explodes with violence when struck by a hard body, or when touched with nitric or strong sulphuric acid. A mixture of 1 part of this salt with 6 parts of niter, or of 3 parts of the fulminate, 5 of chlorate of potash, 1 of sulphur, and 1 of ground glass, is employed as the priming of percussion caps. It is applied as a dry powder, and is made to adhere to the cap by the application of a drop of shellac varnish.

FULMINATE OF SILVER, or FULMINATING SILVER ( $\text{AgC}_2\text{N}_2\text{O}_2$ ), is prepared in nearly the same manner as the fulminate of mercury. It is more powerfully explosive than the last named salt. Even when moist or under water, pressure with a hard body will cause its explosion; and when quite dry, the slightest friction between two hard bodies produces a similar result.

FUMITORY, a genus of annual, rarely perennial, herbs of the natural order *Fumariaceæ*.

FUNCHAL. See MADEIRA.

FUNCTION. Functionality, in Analysis, is dependence on a variable or variables; in the case of a single variable  $u$ , it is the same thing to say that  $v$  depends upon  $u$ , or to say that  $v$  is a function of  $u$ , only in the latter form of expression the mode of dependence is embodied in the term "function."

FUNDS, FUNDING SYSTEM. See NATIONAL DEBT.

FUNEN. See DENMARK.

FUNERAL RITES, ceremonies attending the burial, burning, or disposal otherwise of the dead.

Next to exposure, burial is the simplest method of disposal, and it is the most widespread, being common alike to the lowest and the highest forms of culture. Burial likewise has its varying customs, from laying the body in natural holes or caves to erecting over it majestic temples. A common practice is simply to lay the body out on the ground and pile stones, or as among the Moors, prickly thorns, over it to keep off beasts. The use of the coffin is no sure test of culture, for while some of the rudest peoples lay the dead in a hollowed trunk or a boat, the Mahometan nations use nothing of the kind. Nor is the possession of fixed burying places a better index to the stage of development, for while many primitive tribes have stated burial places, the more advanced Mexicans had none.

Refinements upon ordinary burial are the practices of



first burning the dead, or embalming them, or drying them on trees or artificial scaffolds, before burying them. That plain burial is the earlier custom, and that these other more elaborate and costly fashions are later engraftments upon it, seems to be proved by the fact that many nations adopt more than one custom, and that, while they only bury their women, they first burn or dry their men. The ancient Colchians suspended the corpses of men in trees, but their women they buried. The Gonds and Bhils of India, who have adopted under Hindu influences the practice of burning, still bury their women, while the Todas burn all now, except children, the victims of infanticide, whom they bury. The Mud-dikers, who bury, burn lepers, probably from sanitary reasons; and certain tribes who burn bury the lightning-struck on the spot where they fall. The Kalmucks follow all modes; their usual custom is exposure; but they also burn, or bury, or throw the corpse into the water, or under a heap of stones, or build a hut over it, according to what the priest declares to be most suitable to the condition of the deceased.

Another point of interest in burying is the position of the body in the grave. Some bury their dead lying, others sitting, and there is a remarkable consensus of custom for the practice of laying the body east and west, sometimes with the head to the east and sometimes to the west. This custom is evidently due originally to solar symbolism, and the head is turned to the east or to the west, according as the dead are thought of in connection with the sunrise, the reputed home of deity, or with the sunset, the reputed region of the dead. This practice, however, though nearly universal is not absolutely so, for some tribes lay their dead north and south; and others, like the Bongos, bury men with their face to the north and women with the face to the south; while if one of the Wanyamwesi in Africa happens to die abroad, he is buried facing his native village.

The necessary act of disposing of the corpse has always been accompanied by ceremonies expressive (1) of affection for the deceased or grief for his loss; (2) of present interest in and solicitude for his welfare; (3) of a certain mysterious fear of him in his present state; and (4) of affectionate remembrance of him. These ceremonies vary much under different changes of culture, yet have all the same central elements.

Among primitive nations the most common ceremonial expressions of grief are simple exaggerations of the natural expressions of the emotions,—a carelessness as to usual comforts, and a positive distracting agony. Fasting, neglecting the hair, wearing rags or sackcloth, sitting in ashes, daubing oneself with mud or pigment, are almost universal examples of the one; while ringing the hands, tearing the hair, shaving the head, beating the breast, are common examples of the other.

The most interesting funeral rites, however, are those which express men's ideas of the present state, and their solicitude for the present welfare, of the deceased. There is no nation which does not believe that the soul continues to exist after its separation from the body, in another world like the present, but invisible. Many of the funeral rites of the nations are determined by the belief that death is a journey of the soul from this world to that other, and are meant to provide necessary entertainment for the dead on the way, or even after arrival. Meat, drink, weapons, light, musical instruments, horses, money, servants, wives, are among the most usual things buried with the body.

Graver sacrifices, of animals, wives, and slaves, for the permanent use of the deceased in the next world, have prevailed at one period or another among most nations of Asia, Africa and America. They are con-

spicuously absent from the Semitic peoples, though even among them a trace is found in the Arab custom of leaving the dead man's camel to die on his grave. Of human funeral sacrifices, Hindu suttee is the best known instance. The Fijians strangle wives, slaves and friends to attend the deceased. The Dyaks of Borneo make head-hunting a main business of this life, under the impression that every person whose head they secure will serve them in the next. A kind of suttee by symbol still survives in certain nations when the sacrifice itself is abolished.

The affectionate commemoration of the deceased takes many forms, from simply mourning for a definite period up to periodical funeral feasts, the erection of memorial images, the preservation of the relics as instruments of superhuman power and the worship of the Manes. The natives of Dahomey keep up intercourse with the departed by killing a slave from time to time, whose soul is supposed to go to the dead with the news of the living. The Guinea negroes used to keep the bones of their friends in chests and go occasionally and hold conversation with them. The Mandan women in North America take food year by year to their dead kinsfolk, whose skulls have been preserved in circles of 100 on the prairie. Funeral feasts prevail extensively in America, Africa and Asia, and arise partly, like our own anniversary dinners, from a simple desire to do honor to the dead, but partly also from the belief that the dead participate in the good cheer. They are not merely commemorative but communion meals. Funeral games were probably, like the elaborate dressing of the dead in Brazil and other places in the robes of their patron saints or deities, merely designed to show respect.

To come now to the more cultured peoples, the Greeks either buried or burnt their dead. The body was anointed, crowned with flowers, dressed handsomely and usually in white, laid out in a bed of state with an obolus in its mouth for Charon and a honeycake for Cerberus. These offices were performed by the female relations. The kinsfolk gathered round the bed, and lamented and tore their clothes and hair. On the third day after the death the body was carried out by the friends in a coffin, usually of earthenware, before sunrise—men walking before it, women, attended by the hired mourners, behind—and was buried outside the town. A monument with inscription was raised over the grave. All who took part in the funeral needed to be purified before they could again enter the temples of the gods. Funeral sacrifices were offered on the third, ninth and thirtieth days after. On the last of these days stated mourning ended, and the relatives might appear in public again. It was customary afterward to visit the tomb and leave garlands, and burn meals as offerings to the dead.

The Roman ceremonies were analogous. Burial was the earlier custom. Burning was not general till the republic, but was universal under the empire; the preparation of the body for burial or cremation was performed by a hired body called *pollinctores*. The corpse was dressed in its best,—if a magistrate, in official robes; and if he had while alive been crowned, then wearing the crown. In early times the burial took place at night, but in later times this was the practice only of the poor who could not afford a funeral display. On the eighth day the body was carried to the grave in a stone coffin on a wooden, or in some cases a golden, bier, amid music and lamentation, and sometimes mimic representations of the life and merits of the deceased by professional players. The sons of the deceased went veiled, and the women beat their breasts. When the body was burned, oil, perfumes, ornaments, and everything supposed to be agreeable to the deceased



were thrown into the fire. On returning from the funeral, friends were purified by sprinkling themselves with water or stepping over a fire. Mourning lasted nine days, and on the ninth a funeral sacrificial feast was celebrated, sometimes with games and gladiatorial combats.

The funeral rites of ancient Egypt were too elaborate to be described here. Their chief peculiarities were the embalming of the body and the judgment of the dead before burial.

The Mahometans bury their dead usually on the day of death. The prophet forbade wailing, but this prohibition is generally neglected. Even hired wailing women are employed by some, who wail during all the time the corpse is in the house and on the way to the grave; parts of the Koran are recited by religious officials in the house.

Christian rites are marked by high reverence for the body, due to the belief in its future resurrection. Under Christian influence cremation gradually disappeared from Europe, northern and southern alike, and burial became universal, as being more expressive of the truth held so precious. Christians bury in separate places of their own, which, except among Presbyterians and other sections of Protestants, have been usually consecrated for the purpose by a special ceremony. Interment in churches of favorite martyrs and apostles was at one time much sought after, and had to be repeatedly forbidden by ecclesiastical councils. Bishops and distinguished churchmen or laymen were sometimes allowed to be buried in the church, only not near the altar. Among the early Christians the washing and anointing of the body for the burial were not done by hired persons, but were counted a work of love, done by friend for friend, and by the charitable for the poor and the stranger. The body was swathed in white, decked sometimes with the insignia of office or personal ornaments, placed in a coffin and laid out in the church or in the chamber of death for friends to come and take the last look at it. Three or four days usually elapsed between the death and burial, and vigils were held with prayers and hymn-singing. Hired mourners were forbidden. The funeral took place by day, for, Christian death being a victory, it was meant to give the procession the aspect of a triumph; for which reason those who took part in it carried branches, not of cypress, as among the Romans, but of palm and olive. Evergreen leaves were strewn on the coffin, but the practice of crowning the head with wreaths was forbidden, as savoring of idolatry. Lamps and torches, however, were sometimes carried. The body was borne on a bier, and covered with a pall costly in proportion to the rank of the deceased. It was laid in the grave with face upward and feet to the east, in token of the resurrection at the coming again of the Sun of Righteousness. A service took place at the grave, and, as a rule, does so still among most Christians.

FÜNFHAUS, FÜNFHÄUSEL, formerly HANGENDEN-LISSEN, a flourishing and populous suburb to the southwest of Vienna, forming, along with Sechshaus proper and Rudolfsheim, the commissariat of Sechshaus, and trending in a westerly direction toward Schönbrunn.

FÜNFKIRCHEN, a royal free city of Hungary, capital of the vármegye or county of Baranya, is situated on the declivity of Mount Mecsek, and on the railway to Mohács. It is one of the oldest and finest towns in Hungary, and is the seat of a bishop and of the county administration.

FUNGUS is the name applied to a distinct class of cellular cryptogams or *Thallophyta*. Though as plants the class is well marked by the invariable absence of chlorophyll, and consequently of the physiological phe-

nomena attending its presence and action, it is not so at some points, where a dubious border exists between it and the lower members of the animal kingdom.

The vegetative body or thallus of fungi consists of filiform, cellular elements called *hyphæ*. In one group, the *Phycomycetes*, the hypha usually consists of a single densely branching cell; but in most cases it is composed of a series of cells placed end on end. These hyphæ ramify laterally much more frequently than dichotomously, and the usual mode of growth is by an apical cell which divides transversely; but in the bodies of the larger fungi intercalary growth also occurs (as in *Rhizomorpha subterranea*). A single hypha forms the complete thallus of the simpler fungi called *Hyphomycetes*, *Haplomycetes*, etc., but the bodies of the larger (compound) fungi are composed of a colony of hyphæ, usually densely interwoven, more rarely running in parallel lines, but always more or less firmly adhering together. In many fungi the fully developed tissue consists of polyhedral cells, closely packed, and bearing resemblance to *parenchyma*. This texture, however, consists of ordinary hyphæ, which, through pressure from adjacent parts, have been forced to assume this form.

FUR. Certain animals, which inhabit the colder climates, have a covering upon the skin called fur, lying alongside of another and longer covering, called the overhair. The fur differs from the overhair in that it is soft, silky, curly, downy, and barbed lengthwise, while the overhair is straight, smooth, and comparatively rigid. These properties of fur constitute its essential value for felting purposes, and mark its difference from wool and silk; the first, after some slight preparation by the aid of hot water, readily unites its fibers into a strong and compact mass; the others can best be managed by spinning and weaving.

On the living animal the overhair keeps the fur filaments apart, prevents their tendency to felt, and protects them from injury—thus securing to the animal an immunity from cold and storm—while, as a matter of fact, this very overhair, though of an humbler name, is most generally the beauty and pride of the pelt, and marks its chief value with the furrier. We arrive thus at two distinct and opposite uses and values of fur. Regarded as useful for felt, it is denominated staple fur, while with respect to its use with, and on the pelt, it is called fancy fur. For the one purpose the Russian hare skin is more valuable than the Russian sable, while for the other the sable may be valued at one thousand times the former.

The manufacture of fur into a felt is of comparatively modern origin, while the use of fur pelts as a covering for the body, for the couch, or for the tent is coeval with the earliest history of all northern tribes and nations. They were not simply a barbarous expedient to defend man from the rigors of an arctic winter; woven wool alone cannot, in its most perfect form, accomplish this. The pelt or skin is requisite to keep out the piercing wind and driving storm, while the fur and overhair ward off the cold; and they are as much a necessity to-day among more northern peoples as they ever were in the days of barbarism. With them the providing of this necessary covering became the first purpose of their toil; subsequently the article grew into an object of barter and traffic, at first among themselves, and afterward with their neighbors of more temperate climes; and with the latter it naturally became an article of fashion, of ornament and of luxury. This, in brief, has been the history of its use in China, Tartary, Russia, Siberia and North America, and at present the employment of fancy furs among the civilized nations of Europe and America has grown to be more extensive than at any former period. The supply



of this demand in earlier times led to such severe competition as to terminate in tribal pillages and even national wars; and in modern times it has led to commercial ventures on the part of individuals and companies, the account of which, told in its plainest form, reads like the pages of a romance. Furs have constituted the price of redemption for royal captives, the gifts of emperors and kings, and the peculiar badge of state functionaries. At the present day they vie with precious gems and gold as ornaments and garniture for wealth and fashion; but by their abundance, and the cheapness of some varieties, they have recently come within the reach of men of moderate incomes. The history of furs can be read in Marco Polo, as he grows eloquent with the description of the rich skins of the khan of Tartary; in the early fathers of the church, who lament their introduction into Rome and Byzantium as an evidence of barbaric and debasing luxury; in the political history of Russia, stretching out a powerful arm over Siberia to secure her rich treasures; in the story of the French occupation of Canada, and the ascent of the St. Lawrence to its source in Lake Superior, and the subsequent contest to retain possession against England; in the early settlements of New England, New York, and Virginia; in Irving's *Astoria*; in the records of the Hudson's Bay Company; and in the annals of the fairs held at Nijni-Novgorod and Leipsic. Here it may suffice to give some account of the present condition of the trade in fancy furs. The collection of skins is now chiefly a matter of private enterprise. Few, if any, monopolies exist. The Alaska Commercial Company, now twenty-five years old, enjoys some special privilege for the taking of seal skins on the Pribiloff Islands, and some peculiar restrictions exist in Russia in relation to certain peltries, but beyond this the trade in furs is a free one the world over. Individual enterprise, skill, forecast, and capital, have an open field. The Hudson's Bay Company, with its chief office in London, still maintains its organization, but conducts its affairs in North America under no special or royal grant, and competes in the open market with individual traders throughout Canada, Labrador, Manitoba, and Columbia. Its collection of peltries is offered to the highest bidder at public auction in London, in January, March, and September of each year.

Private collectors and dealers throughout Canada and the United States forward their furs to the seaboard, chiefly to New York, for sale there, or for consignment principally to London and to Leipsic. The latter town still maintains the custom of spring and autumn fairs, at which most kinds of wares are sold or exchanged with dealers from Turkey, Austria, and Russia. Nijni-Novgorod is the chief fair for European Russia, though very important fairs are also held in Kasan and in Irbit among the Ural Mountains. The most important fair for eastern Siberia is held at Kiachta, on the borders of China, where an extensive exchange of furs is carried on with the Celestials. Japan has added but little to the activity or extension of the fur trade, though her northern shores have furnished many a fine fur seal and sea otter to the hardy navigator. Staple furs, or those used chiefly in the manufacture of hats, are those of the hare and the rabbit, collected mainly in Russia, Germany, France, and England, dressed, caroted, and cut from the skin in western Germany, France, Belgium, and England, and thence distributed to the manufacturing centers of the world; and here it may be added that the clippings and cuttings of fancy furs from the workshops of furriers are all saved, and find their way to the machinery which utilizes the waste and transforms them into hatters' furs. But of all these fur marts that of London is the chief, for thither tend by the laws of

trade, not only much of the produce of Asia and Europe, but also the fine peltries of Chili and Peru, the nutria from Buenos Ayres, the fur seal of Cape Horn and South Shetland, the hair seal from Newfoundland, as well as the inferior peltries of Africa. To prepare fur skins in a way to endure this long transportation is a simple and easy matter. When stripped from the animal the flesh and fat are carefully removed, and the pelts hung in a cool place to dry and harden; nothing is added to protect them. Care is taken that they do not heat after packing, and that they are occasionally beaten to destroy worms. A marked exception is the case of the fur seal, which is best preserved by liberal salting and packing in hogsheads. All other raw furs are marketed in bales.

Few kinds of animals furnish a pelt of suitable weight and pliability, and all of them differ widely in elegance of texture, delicacy of shade, and fineness of overhair, and it is these differences which determine their place in the catalogue of merchandise. These few animals are not very prolific, and many of them attain their greatest beauty in wild and uncultivated regions. To this remark there are some notable exceptions. Being thus few in kind, and limited in quantity, one might fear the extinction of the several choice varieties through the persistent energy of the trapper. But here the fickleness of fashion steps in, and does for the fur trade what the law of supply and demand does for the more staple articles of commerce. Fashion, fastidious, and fickle, neglects the use of certain kinds for a season; the market price of the pelt no longer repays the outfit of the trapper; the hunt is intermitted, and in two or three years the animal regains its numbers and strength.

Of the fur-bearers, those that seek their food in water have their finest but shortest fur on the belly, and longer fur upon the back; while those that avoid the rivers have their longest and finest fur upon the back, and their bellies clothed with fine, long, flowing overhair.

Raw furs are made ready for use by softening the pelt with pure butter or sweet oil, trampling them in tubs filled with fine hardwood sawdust at about blood heat, drawing the pelt over a sharp knife to remove every particle of flesh, and finally trampling them again in clean sawdust. The pelt thus becomes soft and pliable like the fine kid used for gloves. They are then ready for the furrier, who assort the skins as to color and overhair, and cuts them in various ways to bring them to the pattern of the article required. Having been sewed together with a close, fine overseam, the article is damped, and stretched upon a smooth pine board after a pattern marked, then nailed along its edges and left to dry. After removal from the board the article is trimmed, and softened by rubbing, and is then ready for the liner. The skill of the furrier lies in the taste exhibited in the arrangement of the furs, and in the economy of use of material.

Furs are dyed in a variety of ways to make them uniform in color, and adapt them to the fashion and taste of the time. Ordinarily this is a cheap and ready process, and only becomes an art when employed upon fine skins, from which the overhair has been first removed by plucking, leaving the fur alone to receive the dye-stuff. Among these are the skins of the musk rat, beaver, otter, and especially the fur seal; the last has received very careful attention, as its entire value depends upon the perfection and success of the process. Unprime fur seals part with their overhair very reluctantly, while the seasoned skins are very readily unhaired, leaving the fur in all its smoothness; thus the best grades are likely to be very good, while the rest rank only from ordinary to very common. A subse-



quent process is the removal of all grease from the fur, which is effected by repeated washings in softened water; if this is imperfectly done, the color will be uneven and not permanent. The final work is to prepare a dye of suitable strength, and apply it in a suitable way, to infuse the coloring matters into the fur, without suffering too much of it to reach the pelt, whereby its durability might be ruined. London claims to have accomplished this for the sealskin in a manner that distances all competition; and it certainly enjoys a wide popularity, as well as the substantial fruits of the sale of its production of colored seals. But America also has its successful dyers of seals, one of the most important of the results they have achieved being the giving to the fur seal a fine deep brown color, without injuring or burning the fur, while leaving the pelt soft, light, and durable.

FUREEDPORE. See FARIDPUR.

FURETIÈRE, ANTOINE, best known as the author of a *Dictionnaire Universel de la Langue Française*, was born at Paris in 1620, and died May 14, 1688.

FURIES are not native to Latin mythology, but adopted and modified from the Greek *Erinyes* (see ERINYES). Originally denoting the avenging power exerted by nature against all transgressors of its regular order, and spoken of by older poets either simply in the singular or in the plural as an indefinite number, the Erinyes assumed later a more rigid and methodical form. As the conception of a future life grew, they were invested with the duty of punishing sinners, and were settled in Tartarus; their number was fixed down to the sacred three, and individual names, Allecto, Tisiphone, and Megæra, occur first in the Alexandrian poets and are adopted in Latin. But beside this, Virgil, and the later poets in imitation of him, frequently employ the Furiæ in another way which is also suggested by a Greek original. The Erinyes are said to madden the transgressor and lead him into further crimes which work their own punishment; and Æschylus by a strong metaphor calls Helen an Erinys, as it were, a scourge of men (*Agam.* 729). Virgil develops this thought so as to make the Furiæ the agents employed by the higher gods to stir up all mischief and strife and hatred on the earth.

FURNACE. Under this name are included all contrivances for the production and utilization of heat by the combustion of fuel.

The word is common to all the Romance tongues, appearing in more or less modified forms of the Latin *fornax*. But in all those languages the word has a more extended meaning than in English, as it covers every variety of heating apparatus; while here, in addition to furnaces proper, we distinguish other varieties as *ovens*, *stoves*, and *kilns*. The first of these, in the form *Ofen*, is used in German as a general term like the French *four*; but in English it has been restricted to those apparatus in which only a moderate temperature, usually below a red heat, is produced in a close chamber. Our bakers' ovens, hot-air ovens or stoves, annealing ovens for glass or metal, etc., would all be called *fours* in French and *Oefen* in German, in common with furnaces of all kinds. Stove, an equivalent of oven, is from the German *Stube*, i. e., a heated room, and is commonly so understood; but is also applied to open fire-places, which appears to be somewhat of a departure from the original signification.

Furnaces are constructed according to many different patterns with varying degrees of complexity in arrangement; but all may be considered as combining three essential parts, namely, the fire-place in which the fuel is consumed, the heated chamber, laboratory, hearth, or working bed, as it is variously called, where the heat is

applied to the special work for which the furnace is designed, and the apparatus for producing rapid combustion by the supply of air under pressure to the fire. In the simplest cases, the functions of two or more of these parts may be combined into one, as in the smith's forge, where the fire-place and heating chamber are united, the iron being placed among the coals, only the air for burning being supplied under pressure from a blowing engine by a second special contrivance, the tuyere, tuiron, twyer, or blast pipe; but in the more refined modern furnaces, where great economy of fuel is an object, the different functions are distributed over separate and distinct apparatus, the fuel being converted into gas in one, dried in another, and heated in a third, before arriving at the point of combustion in the working chamber of the furnace proper.

The most obvious distinction that can be used in the classification of furnaces is founded on the method adopted for supplying air, which may either be blown into the fire, under a pressure above that of the atmosphere sufficient to overcome the resistance presented by the packed columns of fuel and other materials to its free passage, or be drawn through it by a partial vacuum in a chimney formed by the heated gases on their way to the atmosphere. The former are known as *blast furnaces*, and the latter as *chimney draught, air, or wind furnaces*.

The blast furnace in its simplest form is among the oldest, if not the oldest, of metallurgical contrivances. In the old copper smelting district of Arabia Petræa, clay blast pipes dating back to the earlier dynasties of the ancient empire of Egypt have been found in great numbers, buried in slag heaps; and in India the native smiths and iron workers continue to the present day the use of furnaces of similar primitive types. These, when reduced to their most simple expression, are mere basin-shaped hollows in the ground, containing ignited charcoal and the substances to be heated, the fire being urged by a blast of air blown in through one or more nozzles from a bellows at or near the top. This class of furnace is usually known as an open fire or hearth, and is represented in a more advanced stage of development by the Catalan, German, and Walloon forges formerly used in the production of malleable iron, and still current to some extent in Sweden, Corsica, and a few places in central Europe.

The profile adopted for blast furnaces has been very much varied at different times. The earliest examples were invariably square or rectangular in horizontal section, and the same class of form has been retained in many instances up to the present time; but the general tendency of modern practice is to substitute round sections, their construction being facilitated by the use of specially molded bricks, which have entirely superseded the sandstone blocks formerly used. The vertical section, on the other hand, is subject to considerable variation, according to the work to which the furnace is applied.

Blast furnaces are, from the intimate contact between the burden to be smelted and the fuel, the least wasteful of heat; but their use supposes the possibility of obtaining fuel of good quality and free from sulphur or other substances likely to deteriorate the metal produced. In all cases, therefore, where it is desired to do the work out of contact with the solid fuel, the operation of burning or heat-producing must be performed in a special fire-place or combustion chamber, the body of flame and heated gas being afterward made to act upon the surface of the material exposed in a broad thin layer in the working-bed or laboratory of the furnace by reverberation from the low vaulted roof covering the bed. Such furnaces are known by the general name of reverberatory or reverbatory furnaces,



also as air or wind furnaces, to distinguish them from those worked with compressed air or blast.

FURNITURE is the name, of obscure origin, used to describe the chattels and fittings required to adapt houses, churches, ships, etc., for use. The sculptures, paintings, and metal work of antiquity, of the Middle Ages, and of the Renaissance, now kept in museums and private collections, have, with few exceptions, formed part of decorations or of furniture made for temples, churches, or houses. Most of our ancient bronzes, if not images taken from ancient shrines, are pieces of mirrors, tripods, altar vessels, even the dishes and pans of the kitchen. Wood, ivory, precious stones, bronze, silver and gold, have been used from the most ancient times in the construction or for the decoration of seats, chests, tables, and other furniture, and for the shrines and altars of sacred buildings.

The kind of objects required for furniture have varied according to the changes of manners and customs, as well as with reference to the materials at the command of the workman, in different climates and countries. Of the furniture of the ancient Egyptians there remain several examples. The British Museum contains six chairs, about the same in height as those now used. One is of ebony, turned in the lathe and inlaid with collars and dies of ivory. It is low, with a back; and both back and legs are strengthened with rails of cane. The seat is of plaited cane slightly hollowed. Another is shaped out of two frames of four pieces of wood each, hinged in the centers of the longer sides, the lower ends carved into the form of the heads of animals; the seat has been made of skin or other flexible material so as to fold flat. Some Egyptian couches and seats had the legs carved like those of panthers; some had the arms or seat supported by figures representing slaves or captives taken in war. They were upholstered with rich stuffs, and are accurately represented in wall paintings. Workmen's tables, massive blocks of wood with four plain legs, and head rests hollowed out, standing nine or ten inches high, are preserved in the British Museum—some being of alabaster, probably for the sake of coolness. Painted wood chests, with convex lids (not hinged) and mummy cases can be seen both in the British Museum and in the Louvre in Paris.

The excavations of Nineveh have brought to light sculptured representations of Assyrian seats. They were massive, the ends of the seat frame projected in the shape of rams' heads; in some instances figures of captives support the arms; in one described by Sir H. A. Layard, two horses resting on the lower bars from front to back support the seat. The seats were cushioned or upholstered with rich materials. An elaborate piece of carved ivory, with depressions to hold colored glass, agate, etc., from Nineveh, now in the British Museum, has been inlaid into a throne—showing that such objects were sometimes richly decorated. The carving is apparently of Egyptian origin. The furniture of the Assyrians was more massive, and less varied and elegant in execution, than that of the Egyptians.

Greek seats are sculptured in the Parthenon frieze now in the British Museum. They resemble turned wood structures, though perhaps representing bronze. The arms are low and straight, and the backs upright. A curious chair of this kind is represented on one of the bas reliefs from Xanthus (British Museum). In the same collection will be seen statues seated in chairs framed in square bars, the horizontal pieces mortised into the upright, and these details are carefully represented in marble. Certain far-famed gold and ivory statues of colossal size, at Olympia and other places, were represented seated. The bars and frames of the chairs, and of the footstools and pedestals, were constructed of cedar

wood, colored and inlaid with plates of sculptured ivory, and of gold and other precious materials. A sacred chest with carved lid, a table covered with ivory carvings, and other objects in these shrines are described by Pausanias.

The Romans employed Greek artists and workmen. Their chairs, couches, and seats were of similar shape to those of the Greeks. During meals men reclined on couches each made to hold three persons; a low rail protected the back; three of these couches surrounded the table at entertainments, leaving the fourth side open for service. The decoration consisted of rich coverings, constantly changed to suit the season, or in honor of the guests. Women sat during meals.

The chair of St. Peter in Rome, a solid square seat, with pedimental back and paneled with carved ivory, that of St. Maximian in the cathedral of Ravenna, round backed, with arms also paneled with carved ivory, and many representations on carved ivory diptychs or tablets, will give the student a correct notion of the furniture of the divided empire. The character of the curule chair survived and may be recognized in the Bayeux tapestry (St. Edward's seat), and in many mediæval paintings. The architectural features so prominent in much of the mediæval furniture begins in these Byzantine and late Roman thrones. These features became paramount as Pointed architecture became general in Europe, and scarcely less so during the Renaissance. Most of the mediæval furniture, chests, seats, trays, etc., of Italian make were richly gilt and painted. In northern Europe carved oak was more generally used.

Renaissance art made a great change in architecture, and this change was exemplified in furniture. Cabinets and paneling took the outlines of palaces and temples; sometimes they were actually, constructed in perspective, e.g., a small theater front at Vicenza, the work of the younger Palladio. Curious internal fittings were arranged in cabinets, still following the details of architectural interiors. In Florence, Rome, Venice, Milan, and other capitals of Italy, sumptuous cabinets, tables, chairs, chests, etc., were made to the orders of the native princes. Examples of sixteenth-century chests, cabinets, tables, seats, sideboards, etc., can be seen in museums, and in many private houses. *Pietra dura*, or inlay of hard pebbles, agate, lapis lazuli, and other stones, ivory carved and inlaid, carved and gilt wood, marquetry or veneering with thin woods, tortoise-shell, brass, etc., were used in making sumptuous furniture during the first period of the Renaissance.

The elegance of form and perfection of detail which are noticeable in the furniture of the sixteenth century, declined during the seventeenth all over Europe. The framework became bulky and heavy, and the details coarse. Silver furniture was made in considerable quantities by the Spaniards in Spain and Italy, and it was used in the courts of the French and English kings.

The system of veneering, or coating common wood with slices of rare and costly woods, fastened down with glue by screw presses made to fit the surface to be covered, came into general use in the eighteenth century. Marquetry is veneer of different woods, forming a mosaic of pictorial or ornamental designs. In Italy, in Spain, and throughout the dominions of Charles V. and his successors, figure subjects, architectural views, and quaint interiors were represented in these materials.

Looking-glasses in large sheets began to be exported from Venice at the end of the seventeenth century; some were engraved with figures on the backs. The manufacture was established at Tournai, then in Paris, and about the same time at Battersea on the Thames—under Government protection in both coun-



tries. The light fantastic frames which came into fashion in France were called *rococo*. Carved and gilt furniture was made in Italy, where it was best designed, and all over Europe till late in the eighteenth century.

A return has been made during recent years to mediæval designs. In England there is a going back to the fashions prevalent during the first fifty years of the last century. The elegant Louis XVI. style is more popular in France.

As regards furniture of the day, and the proprieties which ought to be observed in form and decoration, it is a matter of regret that no definite style is recognized in Europe; there cannot but be some consequent waste of power and uncertainty of aim. A few general principles, however, are held to be applicable to the shape and arrangements of furniture of whatever style.

The mahogany carved chairs of Chippendale and Sheraton are often copied, but the repetitions have not the spirit of the originals.

FURRUCKABAD. See FARRAKHÁBÁD.

FÜRST, JULIUS (1805–1873), Orientalist, was born of Jewish parents at Zerkowo in Posen.

FURSTENBERG, the name of two noble houses of Germany.

I. The more important is in possession of a media-tized principality in the district of the Black Forest and the Upper Danube, which comprises the countship of Heiligenberg, about seven miles to the north of the lake of Constance, the landgraviates of Stühlingen and Baar, and the lordships of Jungnau, Trochtelfingen, Hausen and Möskirch or Messkirch. The territory is discontinuous; and as it lies partly in Baden, partly in Württemberg, and partly in the Prussian province of Sigmaringen, the head of the family is an hereditary member of the first chamber of Baden and of the chamber of peers of Württemberg and in Prussia. The *Stammort* or ancestral seat of the family is Fürstenberg in the Black Forest, about thirteen miles north of Schaffhausen, but the principal residence or the present representatives of the main line is at Donaueschingen. The Fürstenbergs are descended from the counts of Urach, in the valley of the Ems, to the east of Tübingen — Henry I., the youngest son of Egon VI. of Urach, ranking as the founder of the family.

II. The second Fürstenberg family has its possessions in Westphalia and the country of the Rhine, and takes its name from the castle of Fürstenberg on the Ruhr, which is said to have been built by Count Dietrich or Theodoric of Oldenburg, in the eleventh century.

FÜRSTENWALDE, a town in the Prussian province of Brandenburg, government of Frankfort, on the right bank of the Spree, and on the railway between Berlin and Frankfort-on-the-Oder, twenty-eight miles east of the former city.

FÜRTH, an important manufacturing town of Bavaria, circle of Middle Franconia, at the confluence of the Pegnitz with the Rednitz, five miles northwest of Nuremberg, with which it is connected by railway. The population is 27,360.

FURZE, GORSE, or WHIN, *Ulex*, Linn., a genus of thorny papilionaceous shrubs, of few species, confined to west and central Europe and northwest Africa. Its chief use is in making fences.

FUSELI, HENRY, an eminent painter and writer on art, was born at Zurich, in Switzerland, in 1741. After taking orders in 1761, Fuseli was obliged to leave his country for a while in consequence of having aided Lavater to expose an unjust magistrate, whose family was still powerful enough to make its vengeance felt. He first traveled through Germany. and then, in 1763, vis-

ited England. By Sir Joshua Reynolds' advice he devoted himself wholly to art. In 1770 he made an art-pilgrimage to Italy, where he remained till 1778, changing his name from Füssli to Fuseli, as more Italian-sounding. Early in 1779 he returned to England, taking Zurich on his way. He found a commission awaiting him from Alderman Boydell, who was then organizing his celebrated Shakespeare gallery. Fuseli painted a number of pieces for this patron, and about this time published an English edition of Lavater's work on physiognomy. He likewise gave Cowper some valuable assistance in preparing the translation of Homer. In 1788 Fuseli married Miss Sophia Rawlins (who it appears was originally one of his models, and who proved an affectionate wife), and he soon after became an associate of the Royal Academy. Two years later he was promoted to the grade of Academician. In 1799 he exhibited a series of paintings from subjects furnished by the works of Milton, with a view to forming a Milton gallery corresponding to Boydell's Shakespeare gallery. In 1799 also he was appointed professor of painting to the Academy. Four years afterward he was chosen keeper, and resigned his professorship; but he resumed it in 1810, and continued to hold both offices till his death. In 1805 he brought out an edition of Pilkington's *Lives of the Painters*, which, however, did not add much to his reputation. Canova, when on his visit to England, was much taken with Fuseli's works, and on returning to Rome in 1817 caused him to be elected a member of the first class in the Academy of St. Luke. Fuseli, after a life of uninterrupted good health, died at Putney Hill, 1825, at the advanced age of eighty-four, and was buried in the crypt of St. Paul's Cathedral. He was comparatively rich at his death, though his professional gains had always appeared to be meager.

FUSEL OIL, the name applied to the volatile oily liquids, of a nauseous fiery taste and smell, which are obtained in the rectification of spirituous liquors made by the fermentation of grain, potatoes, the must of grapes, and other material, and which, as they are of higher boiling-point than ethylic alcohol, occur in largest quantity in the last portions of the distillate.

FUST, JOHANN (?...–1466), often considered as the inventor or one of the inventors of printing, belonged to a rich and respectable burgher family of Mainz, which is known to have flourished from 1423, and to have held many civil and religious offices, but was not related to the patrician family of Fuss. The name was always written Fust, until in 1506 Johann Schöffer, in dedicating the German translation of Livy to the Emperor Maximilian, called his grandfather Faust. There is no evidence that John Fust was a goldsmith. He appears to have been a money-lender, or banker and speculator, better known for prudence than for uprightness and disinterestedness. His connection with Gutenberg, who is now generally, though not universally, admitted to be the real inventor of printing, has been very variously represented, and Fust has been put forward by some as the inventor of typography, and the instructor as well as the partner of Gutenberg, by others as his patron and benefactor, who saw the value of his discovery and had the courage to supply him with means to carry it out. This view has been the most popular; but during the present century Fust has been frequently painted as a greedy and crafty speculator, who took advantage of Gutenberg's necessity and robbed him of the fruits of his invention. Gutenberg, many years resident in Strasburg, where he was long engaged in the experiments and attempts which resulted in his discovery of typography, is not known to have been there after 1444. His uncle Henne (or Johann) Guten-



berg, senior, on October 28, 1443, took the house in Mainz called Zum Jungen, where Gutenberg afterward carried on printing. Having already exhausted his own resources in his long-continued and costly experiments, Gutenberg, through his cousin Albrecht Gelthuss zum Echtzeller, borrowed 150 florins in Mainz October 6, 1448. This sum was quite insufficient for his purposes, and on August 22, 1459, as appears from the amount of interest afterward claimed, he made an agreement with Fust, who was to advance him 800 gold florins to make and procure his tools and materials, which were to be security for the loan. Fust was also to give him 300 florins a year for expenses, wages, house rent, parchment, paper, ink, etc. They were to divide the profits equally, and if they wished to separate, Gutenberg was to return the 800 florins, and the materials were to cease to be security. Fust was to have half the profits, being both holder of a mortgage and partner in the firm. Gutenberg carried on the business at Zum Jungen, where he lived. It is difficult to ascertain precisely what books were printed while the partnership lasted. Their greatest work was the *Latin Bible* known as the *Bible of Forty-two lines*, because a page contains forty-two lines, and also as the *Mazarin Bible*, because the first copy described was found in the library of Cardinal Mazarin. It was finished at latest in 1455, and is a folio of 1282 printed pages, with spaces left for the illumination of initials. Ulric Zell states, in the Cologne Chronicle of 1499, that Gutenberg and Fust printed the Bible in large type like that used in missals. It has been said that this description applies to the forty-two line Bible, as its type is as large as that of most missals earlier than 1500, and that the size now called missal type (double pica) was not used in missals until late in the sixteenth century. This is no doubt true of the smaller missals printed before 1500, some of which are in even much smaller type than the forty-two line Bible. It required scarcely less than such a work, says Madden, to induce Fust to advance such large sums of money. Some other smaller works were printed by the partners, as the Papal Letters of Indulgence of 1454-5, granted April 12, 1451, by Nicolas V., in aid of John II., king of Cyprus, against the Turks, and probably many now lost. Peter Schöffer of Gernsheim, between Mainz and Mannheim, who was a copyist in Paris in 1449, and who is called by Fust his servant (*famulus*), is said by Trithemius to have discovered an easier way of founding characters. Lambinet and others have concluded from this that Schöffer invented the punch. Schöffer himself, in the colophon of the Psalter of 1457, a work which probably was planned and partly printed by Gutenberg, claims only the mode of printing rubrics and colored capitals. Didot believes that Schöffer discovered the *movable* mold, and that Gutenberg alludes to this discovery and to Schöffer's youth when he says in the colophon of the *Catholicon* of 1460 that God reveals to babes what He hides from the wise. Fust, quite unexpectedly as it seems, and before the profits of the undertaking could be realized, brought a suit against Gutenberg to recover the money he had lent, claiming 2,026 florins for principal and interest. He had made a second loan of 800 florins in 1452, but had not paid the 300 florins a year, and, according to Gutenberg, had said that he had no intention of accepting interest. The suit was decided in Fust's favor, November 6, 1455, in the great refectory of the Barefooted Friars of Mainz, when Fust made

cath by all the saints that he had borrowed 1,550 florins and given them to Gutenberg. Fust removed the portion of the printing materials covered by his mortgage to the house belonging to him called Zum Humbrecht, where he carried on printing with the aid of Peter Schöffer, to whom he gave his only daughter Dyna or Christina in marriage about 1465. Their first publication was the Psalter, August 14, 1457, a folio of 350 pages, the first printed book with a complete date, and remarkable for the beauty of the large initials printed each in two colors, red and blue, from types made in two pieces, a method patented in England by Solomon Henry in 1780, and by Sir William Congreve in 1819. The Psalter was reprinted with the same types, 1459 (August 29), 1490, 1502 (Schöffer's last publication), and 1516. Fust is said to have gone to Paris in 1466, and to have died of the plague, which raged there in August and September. He certainly was in Paris on July 4th, when he gave Louis de Lavernade, a distinguished gentleman of the province of Forez, then chancellor of the Duc de Bourbon and first president of the parliament of Toulouse, a copy of his second edition of Cicero, as appears from a note in Lavernade's own hand at the end of the book, which is now in the library of Geneva. But Fust probably did not die until October 30th, on which day, probably in 1471, an annual mass was instituted for him by Peter Schöffer and Conrad Henlif in the church of St. Victor of Paris, where he was buried.

Fust has been often confounded with the famous magician Dr. Johann Faust, no doubt a real person, though the fables gradually gathered round his name have formed a regular mythical saga.

FUSTIAN, a term which includes a variety of heavy woven cotton fabrics, chiefly prepared for men's wear. It embraces plain twilled cloth called jean, and cut fabrics similar to velvet, known as velveteen, moleskin, corduroy, etc. The operations connected with the finishing of cut fustian (cutting, brushing and singeing, etc.) are conducted under unhealthy conditions. The name is said to be derived from El-Fustat, a suburb of Cairo, where it was first made; and certainly a kind of cloth has been long known under that name.

FUSTIC, or YELLOW WOOD, also known as old fustic, is a dye-stuff consisting of the wood of a large tree of the natural order *Moraceæ*, growing in the West Indies and tropical America, and having oblong, taper-pointed leaves, and an edible fruit. Fustic occurs in commerce in blocks, which are brown without, and of a brownish-yellow within. It is sometimes employed for inlaid work.

FUTTEHPUR. See FATHIPUR.

FUX, JOHANN JOSEPH (1661-1741), the composer of more than 400 works of various kinds and dimensions, but chiefly remembered as the author of a theoretical work on music.

FYT, JOHANNES, was born at Antwerp August 19, 1609. He was registered apprentice to Hans van den Berghe in 1621. At twenty Johannes Fyt entered the guild of St. Luke as a master, and from that time till his death in 1661, he produced a vast number of pictures in which the bold facility of Snyders is united to the powerful effects of Rembrandt, and harmonies of gorgeous tone are not less conspicuous than freedom of touch and a true semblance of nature. He died in 1661.

FYZABAD, another name for FAIZABAD (*q. v.*)



## G.

**G** represents the sound of Gamma, the third letter of the Greek alphabet; but in the Latin alphabet, and in the alphabets derived from the Latin (including our own) it holds the place which Z held in the different Greek alphabets. The history of this remarkable change is well known. It has been already stated (see letter C) that in the fifth century before our era, the distinction between the *k*-sound and the *g*-sound became lost in Rome; apparently the surviving sound was *g*; but, at all events, the symbol K went out of use, being retained only in a few familiar abbreviations, and C (which was the Latinized form of the Greek Γ) remained. Thus in the column of Duillius we find C representing the original surd in *castreis cepet*, etc., but the sonant in *macistratos, leciones, ceset* (i. e., *gessit*), etc. When, in the third century, the two sounds were again distinguished, two symbols were again required; but the K was not taken again to represent the surd; C, the old symbol for the sonant, was put to that use. A new symbol was therefore necessary for the sonant *g*-sound, and it was found by modifying C into G. This G should then have replaced C as the third letter of the alphabet, where it would have stood, as before, between B and D, the sonants of the labial and dental classes, respectively. But this was not done. The symbol C was left in its old place with its new value of *k*. The new symbol G was set in the seventh place of the alphabet, which had been vacated by Z, the representative of a sound not used by the Romans of that day. G is found for the first time in the inscription on the tomb of Scipio Barbatus. Its invention is attributed to Spurius Carvilius.

There can be no doubt that the sound of G in Latin, as of Γ in Greek, was always the sonant guttural—which we hear in *gate*, etc. It was not the sonant palatal, which it represents in *gem* or *gin*. This sound began to supplant it about the sixth century of our era, but only when it preceded *e* or *i*—the two vowels which require a position of the tongue nearer to the palatal than to the guttural consonants. We find this change of sound in French and in Italian. In the Latin part of our vocabulary there is naturally the same weakening; whereas, in words of English origin, the original guttural is generally preserved, even before *e* or *i*, as in *get* and *give*. Sometimes it has been weakened at the end of a word, as in *bridge* and *ridge*, which were originally *brigg* and *rigg*, and are still so in the north of England.

GABELENTZ, HANS CONON VON DER, a distinguished linguist and ethnologist, born at Altenburg, October 13, 1807, was the only son of Hans Karl Leopold von der Gabelentz, chancellor and privy-councilor of the Duchy of Altenburg. He died on his estate of Lemnitz, in Saxe-Weimar, on September 3, 1874. In the course of his life, he is said to have learned no fewer

than eighty languages, thirty of which he spoke with fluency and elegance. But he was less remarkable for his power of acquisition than for the higher talent which enabled him to turn his knowledge to the genuine advancement of linguistic science.

GABII, an old, and at one time important, city of Latium, on the Via Prænestina, or road to Præneste, between twelve and thirteen miles east of Rome.

GABLER, GEORG ANDRES, a German philosophical writer of the school of Hegel, was born at Altdorf, in Bavaria, where his father was professor, on July 30, 1786. He died at Teplitz, September 13, 1853.

GABLER, JOHANN PHILIPP, a learned Protestant theologian of the school of Griesbach and Eichhorn, was born at Frankfort-on-the-Main, June 4, 1753, and died at Jena, February 17, 1826.

GABLONZ, the chief town of a circle in Bohemia, is situated in a hilly country on the river Neisse, about six and one-half miles southeast of Reichenberg.

GABOON RIVER, or RIO DE GABAO, called Ole Mpongwe by the Mpongwe natives, and Aboka by the Fan, is, in reality, not a river but an estuary on the west coast of Africa. It lies immediately north of the equator, disemboing in 0° 21' 25'' N. latitude and 9° 21' 23'' W. longitude. At the entrance, between Cape Joinville, or Santa Clara, on the north, and Cape Pangara, or Sandy Hook, on the south, it has a width of about eighteen miles. It maintains a breadth of about seven miles for a distance of forty miles inland, when it contracts into what is known more correctly as the Rio Olambo, which is not more than two or three miles from bank to bank. Two rivers, the Nkomo or Como, and the Mbokwa or Bokoe, discharge into the upper portion of the Rio Olambo.

GABRIEL is the name of the heavenly messenger (see ANGEL) who was sent to Daniel to explain the vision of the ram and the he-goat, and to communicate the prediction of the Seventy Weeks.

GAD in Hebrew and Chaldee means "luck." Gad is also the name of a "prophet" or "seer," who was probably a pupil of Samuel at Naioth, and a companion of David, to whom he early attached himself.

GADÂMES, GHADÂMES, or RHADÂMES, the chief town of an oasis of the same name, in that part of the Sahara which belongs to the regency of Tripoli, not far from the frontier of Algeria.

GADARA, an ancient city of Syria, in the Decapolis, about six miles southeast of the Sea of Galilee, on the banks of the Hieromax.

GADDI. Four painters of the early Florentine school—father, son, and two grandsons—bore this name.

I. GADDO GADDI (1239 to about 1312) was, according to Vasari, an intimate friend of Cimabue, and afterward of Giotto. He was a painter and mosaist.



2. TADDEO GADDI (about 1300-1366, or later), son of Gaddo, was born in Florence, and became one of Giotto's most industrious assistants.

3. AGNOLO GADDI, born in Florence, was the son of Taddeo; the date of his birth has been given as 1326, but possibly 1350 is nearer the mark. He was a painter and mosaist.

4. GIOVANNI GADDI, brother of Agnolo, was also a painter of promise. He died young.

GADIATCH, a town of Russia, at the head of a district in the government of Poltava, situated on the elevated banks of the Grun and the Psel, seventy-three miles north-northwest of Poltava. Population, 9,000.

GADSDEN, the county seat of Etowah county, Alabama, is situated on the west bank of the Coosa river, at the foot of a mountain range. It possesses first-class transportation facilities by rail and river, and since the development of the iron mines has become an important mining and manufacturing point. The industries include foundries, lumber and flouring mills, and wood-working mills. Cotton is shipped, and there is considerable trade. The population in 1890 approximated 6,000.

GADWALL, a word of obscure origin, the common English name of the Duck, called by Linnæus *Anas strepera*, but considered by many modern ornithologists to require removal from the genus *Anas* to that of *Chaulelasmus* or *Ctenorhynchus*, of either of which it is not only the typical but the sole species.

GAELIC LANGUAGE AND LITERATURE. Until recently there was doubt as to the family of languages to which the Gaelic belonged; indeed, with many scholars the impression existed that it belonged to the Semitic branch, and that its relations must all be traced among some one or other of its varieties. This view arose very much from the neglect with which the language had been treated by scientific men. It is doubtful whether a higher class of scholarship has been nurtured anywhere than in the study of the Celtic languages.

The first who brought real scholarship to bear upon the question of the family to which the Celtic dialects belonged was Dr. Cowles Pritchard. His *Eastern Origin of the Celtic Nations* is a work of the highest value, distinguished by its erudition, and the sound judgment it displays. He was one of the most remarkable men whom Britain has produced in the field of comparative philology. No doubt it is with the Welsh he chiefly dealt, but, in discussing such questions as he had to deal with, it mattered little which of the Celtic tongues was made use of. Many writers followed Doctor Pritchard, and there is now, as has been said, no question about the Aryan source of the Celtic languages. It is not that the words are to a large extent analogous, but the grammatical structure and the idioms correspond to such an extent that the question is put beyond a doubt; while, with the exception of a few common vocables, there is little that is analogous between the Celtic and the Semitic languages.

The territory once occupied by the Celtic race is a question of much interest. Now they are confined within well-known limits. On the European continent they occupy that part of France usually called Brittany, the most westerly portion of the country terminating in Cape Finisterre. They occupied this territory so early as the days of Julius Cæsar, although it has been said that they were emigrants from Britain at a later period. The topographical terms given by Cæsar in describing the Roman invasion all indicate that the language of the natives of Brittany used then, and for a long time before, was as much Celtic as it is now. Opposite to Brittany lies British Cornwall, a region with a Celtic

tongue until about 100 years ago. The two Cornwalls—one in Britain and the other in France—terminated, one on each side, the territory occupied by the Celt. The dialects spoken in these stood in the closest relationship. To the north of this lies the greatest of all the modern sections of the Cimbrian Celts. Wales, occupied by about a million inhabitants, is nearly Celtic, and uses the ancient tongue of Wales and Cumbria, or Strathclyde. Across the sea from Wales lies the Isle of Man, where the Gaelic branch of the Celtic held sway, and does to some extent still. In Ireland the Gaelic also prevailed, and is still spoken by about a million people. And lastly, in the Scottish Highlands about 300,000 people still use, less or more, the old Gaelic tongue of Scotland. Thus Brittany, Wales, Isle of Man, western Ireland, and the Scottish Highlands are now the territory of the Celtic languages. That they once occupied a wider sphere is beyond a doubt. There are traces of the tongue, in one form or other, to be found all along southern Europe. Topography is a valuable source of evidence, and one that will be made to serve purposes it has never served as yet; and it furnishes us—in Italy, France, Switzerland, Spain, and Portugal—with relics which, like animal fossils dug from the depths of the earth, speak unmistakably of what formerly existed there. How far the Gaelic form of Celtic speech prevailed it is difficult to say, or whether it existed alongside of the Cimbric on the continent of Europe. But the name Gallia is significant as applied to France; and it is a suggestive fact that, to this day, the Bretons call France Gaul, as distinguished from their own country, and in like manner call the French language Gallic, as distinguished from the Breton. In Scotland the Gaelic and Cimbric races long dwelt together, distinct and yet nearly related. When they separated, either as to race or language, is not easily settled. There are indications on the Continent which rather throw doubt on the idea maintained by some writers that the divergence took place after the settlement of the race in Britain, and farther inquiry as to these indications is essential ere a satisfactory conclusion can be reached. But within the historic period the two races existed side by side in Scotland, the Cimbric occupying the region called Strathclyde, with their separate government and laws, and the Gael at least occupying the Dalriadic kingdom of Argyll. The people called by the Romans Picts occupied the north and east of Scotland. That these were the same people with the Dalriadic Scots is somewhat questionable. That they were closely related to them is beyond a doubt, but that they had linguistic and other peculiarities is manifest. Their topography proves it, being different from that of either Ireland or Argyll, and, so far as the historic relations of both are concerned, they indicate a state of chronic war. For centuries there were mutual raids of Scots on Picts, and Picts on Scots, until finally, under Kenneth MacAlpine, king of Dalriada, the Picts were overcome in the year 843, and they and the Scots became united under one monarchy. The tradition is that the Picts were annihilated—meaning, in all likelihood, their power—and there arose one great united kingdom. The united people are the ancestors of the present Scottish Highlanders, and the Gaelic language has come down from them to us, influenced as to structure by the dialect spoken and written by the victors.

The Gaelic language, as now in use in Scotland, resembles closely in its structure both the Irish and the Manx. They form one family, and yet it has its own distinctive features. Irish scholars maintain that it is a modern and corrupt offshoot of the Irish, and account in this way for these peculiarities. They say, for ex-



ample, that the absence of the present tense in the Gaelic verb is a mere instance of decay, and proves the modern character of the dialect. But the Welsh is no modern and corrupt form of Irish, but an ancient, distinct tongue, so far back as history carries us. And yet it wants the present tense, indicating that this peculiarity is distinctive of some of the Celtic tongues, and that what is cited as a proof of recency may in reality be a proof of priority. The present tense may be called an Irish addition made to the verb in the process of culture. At the same time it must be allowed that there is a difficulty in proving from any literary remains existing, that the present Scottish form of the language is of great antiquity. All the literary relics that have come down to us are written in what is usually called the Irish dialect. The present tense is in universal use, as well by Scottish as by Irish writers. This arose from the identity of the Irish and Scottish churches. The dialect in which all theological treatises were written, was one, and this dialect extended from the clergy to bards, and sennachies, and medical men. There is not a page of Gaelic written in any other dialect before the middle of last century. But as in other countries, there was both a spoken and a written dialect in use; so in both Scotland and Ireland there appears to have been a dialect in use among the people as their common speech, and another used by their scholars—the former varying according to locality, and the latter being identical throughout.

**GAELIC LITERATURE.** The literature of the Scottish Highlands may be divided into several branches.

**Mythology.**—We have first the mythology of the race. Little of this now exists, and it is difficult to piece the scattered fragments together. We find the mythology of the older faith or faiths interwoven in some cases with the mythology of the Northmen. The mythology of the East appears at some points, and we have giants, fairies, and witches, some of them firmly believed in to the present day. Adamnan, in his life of Columba, refers to the magi who were in the palace of the Pictish king whom the missionary sought to convert. Who these were, and what was their creed, is not clearly stated, but all we read of that early faith, and all that tradition brings down to us, would seem to indicate that their worship was a form of sun worship. The words applied to the cardinal points of the compass convey this impression; the fear shown in many ways of going against the course of the sun, and certain festivals in which fire was and is used, would seem to confirm it. The bodies of the dead are in some cases carried sun-wise round certain objects on their way to the burial ground; in fact, words and practices crop up in several parts of the country serving to show that the sun was worshiped. *Rath*, a circle, is used in Gaelic to express good fortune:—*cha-n'eil rath air*, there is no circle on him,—he is not fortunate,—referring, no doubt, to the course of the sun. There was a Gaelic mythology connected with the Fingalian heroes. Whether they themselves were mythical or not is debated, but there was a mythology connected with them. Fingal had a sword that never required to be used twice; the Vulcan of the race could cross a glen with a stride; Manannan, son of Lir, from whom the Isle of Man is named, could clothe himself in a fog, and so hide himself from his enemy. The story of Diarmad and the boar, and the story of Fraoch and the beast, are mythological, the former being the Celtic story of Achilles, and the latter the Celtic version of the Garden of the Hesperides. Then there were giants called *Na Fiantaichean*, men of colossal mold. *Dun Fhian*, the giant's castle, is a common topographical term.

A collection of Gaelic proverbs was made, in the year

1819, by the Rev. Donald Mackintosh, and, to form some idea of the number of them, it is only necessary to observe that, under the letter "I" alone, they reach the number of 382 in the first edition of the book. A large number of these proverbial sayings escaped the notice of Mr. Mackintosh, and additions were made in the second edition, while some of the very best are not recorded even yet. Proverbial sayings in English are represented by sayings of a different kind in Gaelic, having the same meaning. "There is many a slip between the cup and the lip," is represented by *Is le duine an ni a shluigeas e, ach cha leis an ni a chagaineas e*, "What a man swallows is his own, but not what he chews." "It never rains but it pours" is represented by *An uair a theid a' chailleach 'n a ruith, theid i 'n a deann-ruith*, "When the old woman takes to running, she runs with a will." "Sour grapes"—*Mionnan a' bhaird ris a' chaisteal, cha téid mi fhéin do'n chaisteal bhreun, cha teid, cha leig iad ann mi*, "The bard's oath to the castle, 'I won't go to the vile castle; no, they won't let me in.' " The Gaelic proverbs are full of interest, and add much to the power of either speech or writing when skillfully used.

**Sgeulachdan, or, Tales of Fiction.**—These at one time abounded in the Highlands, and had much in common with the tales collected and published by Grimm and Dasent, from the German and the Norse.

**Clan History.**—A portion of the literature of the Gaelic Celt consists of clan history. The clan system does not seem to be very ancient. In all probability it dates from the period when the Gaelic kingdom of Scotland ceased to exist. It has been already said to date from the era of charters. But the two eras are pretty nearly identical. Down to the reign of Malcolm III. the Gaelic kingdom appears to have been to a large extent homogeneous. There were no elements in it but what were Celtic, as it never really embraced within it the Scandinavian sections.

**MS. Literature.**—The written Gaelic literature was at its earlier period so mixed up with that of Ireland that it is not easy in every instance to distinguish them. The early church of both countries was one, and the early literature was the offspring of the early church. The very first notices we have of the church, whether among the mission institutes of Ireland or Iona, indicate the existence and extensive cultivation of a native literature. The transcription or translation of portions of the Scriptures is shown to have been one of the frequent exercises of the early missionaries, and they all learned to write the same dialect, and make use of the same letters. Many of the MSS., written in Iona, may be credited to Ireland, and *vice versa*; and writings found in Continental libraries may be presumed to have been the work of Scottish, as truly as of Irish, writers. The early treatises, and glosses upon Latin treatises, on theological and other subjects, still existing in the early Gaelic dialect, are numerous, and have afforded materials for the acute and masterly criticism of Zeuss, De Nigra, Stokes, and others; and these are accompanied by treatises on grammar, history, medicine, astrology, metaphysics, poetry, and similar subjects, which are of much interest. Most of these remains are found in the collections in Trinity College, Dublin, and in the library of the Irish Royal Academy; but there are numerous remains in the Edinburgh Advocate's Library, which prove at least that there were in Scotland persons who valued and collected this literature. There can be no doubt that there were many contributions to it as well.

The nineteenth century has seen many large contributions to the literature of the Gaelic Celt. It has shared in the general progress of learning, and with this it has risen in the estimation of the scholars of Europe.



Grammars and dictionaries have been compiled; magazines of various kinds have been started and carried on for a time with much vigor; collections, such as Mackenzie's *Beauties of Gaelic Poetry*, have been made; and such provisions have been laid up for the future as to secure an ample supply of materials for the scholars of a coming age. That appears to be the special work laid upon the scholars of the present time. They have to collect materials and commit them to writing, and to describe the peculiarities that are distinctive of a living language, for the use of those who hereafter can only study it as existing in books, where emphasis, and tone, and accent are altogether unknown, and where the comments and expositions of living men, familiar with the language and the literature from their childhood, are altogether wanting. For that the Gaelic language is in a state of decay is manifest to the most ordinary observer. And the decay is two-fold, being both within and without. Within, the vocabulary is waning, and English words are coming into use. Gaelic idioms are in like manner disappearing, and English idioms replacing them; while from without, under the influence of education, immigration, steamboats, railways and other modern devices, English is rapidly finding its way into the land, and pushing the ancient tongue out of it. When this process is completed, a change will befall the people, too, for there is no doubt that there is a close relation between the character of a language and the character of the people who use it; so that, when the Gaelic disappears, many of the features distinctive of the Highland character will disappear along with it. In some respects this will be cause of regret; in others perhaps it will not.

GAETA, at one time the "Gibraltar of Italy," a strongly-fortified seaport town in the province of Caserta, at the extremity of a peninsula forming the north-west boundary of the Gulf of Gaeta, with a station on the railway forty miles northwest of Naples.

GÆTULIA, or the land of the Gætuli, an ancient district of somewhat uncertain limits in northern Africa. It may be roughly said to have been bounded on the north by Mauretania and Numidia, east by the country of the Garamantes, south by the basin of the Niger, and west by the Atlantic; but the frontiers must have been of a very uncertain and shifting character.

GAGE, THOMAS, governor of Massachusetts, second son of the first Viscount Gage, was born in England in 1720. He entered the army at an early age, became lieutenant-colonel of the forty-fourth regiment of foot in 1750, was made major-general and governor of Montreal in 1761, and in 1763 succeeded Amherst in the command of the British forces in America. In 1774 he was appointed governor of Massachusetts, and in that capacity was intrusted with carrying into effect the Boston Port Act. In this political crisis, by his hesitancy in adopting measures against the leaders of the insurrectionary party, and contenting himself with fortifying Boston, he enabled the Americans to mature their plans in comparative security. The battle at Lexington, in which a detachment sent by him, on April 18, 1775, to destroy the cannon and ammunition at Concord was defeated, inaugurated the American revolutionary war. On June 12th he proclaimed martial law, and proscribed Samuel Adams and John Hancock, offering pardon to all the other rebels who should return to their allegiance; but the result of these measures was at once to exasperate and encourage the Americans. Although Gage gained the nominal victory of Bunker's Hill (June 17th), he was unable to raise the siege of Boston; and being shortly afterward superseded by General Howe, he sailed for England. He died in 1787.

GAGERN, HANS CHRISTOPH ERNST, BARON VON, a German statesman and political writer, was born at Kleinniederheim, near Worms, January 25, 1766. He retired from public life in 1848, and died at Hornau, October 22, 1852. Three of the sons of Baron Gagern have attained considerable eminence — one as a soldier, and two as politicians.

GAILLAC, the capital of an arrondissement in the department of Tarn, France, is situated on the right bank of the Tarn, twelve miles west of Albi.

GAILLARD, GABRIEL HENRI, a French historian, was born at Ostel, Picardy, in 1726. He died at St. Firmin, near Chantilly, February 13, 1806.

GAINES' MILL, a hamlet in Virginia, in Hanover county, noted as the scene of a bloody battle between the Federal and Confederate troops, during the efforts to capture Richmond by the former, under McClellan, June 27, 1862. The Confederates were commanded by General Lee, and the result of the battle was a Federal defeat.

GAINSVILLE, the county seat of Cooke county, Texas, is a flourishing city of 6,563 inhabitants. It has considerable trade in stock, contains three national banks and three newspaper offices, and manufactures of carriages, flour, furniture, etc.

GAINSBOROUGH, a market-town and port of Lincolnshire, is situated on the right bank of the Trent, twenty-one miles above its junction with the estuary of the Humber, and sixteen miles northwest of Lincoln.

GAINSBOROUGH, THOMAS, a painter famous for the truth and elegance of his portraits, and for the simple beauty of his landscapes, was born at Sudbury, Suffolk, in the year 1727. At ten years old, Gainsborough had sketched every fine tree and picturesque cottage near Sudbury, and at fifteen, having filled his task-books with caricatures of his schoolmaster, forged his father's handwriting to get a holiday, and sketched the portrait of a man whom he had detected in the act of robbing his father's orchard, he was allowed to follow the bent of his genius in London, under such advantages as Hayman, the historical painter, and the academy in St. Martin's Lane, could afford. Three years of study in the metropolis were succeeded by two years of idleness in the country.

Gainsborough had not been many months in London ere he received a summons to the palace, and to the end of his career he divided with West the favor of the court, and with Reynolds the favor of the town. In February, 1788, while witnessing the trial of Warren Hastings, he felt an extraordinary chill at the back of his neck; this was the beginning of a cancer (or, as some say, a malignant wen) which proved fatal on August 2d of the same year.

Gainsborough and Reynolds rank side by side as the greatest portrait painters of the English school.

GAISSIN, GAICYN, or HAISCIN, a town of Russia, at the head of a district in Podolia, 178 miles east of Kamenetz Podolski or Podoliau Kamenetz, near the river Sop, a tributary of the Bug.

GAIUS, a celebrated Roman jurist. Of his personal history very little is known. It is impossible to discover even his full name, Gaius or Caius being merely a personal name (prænomen) very common in Rome. From internal evidence in his works it may be gathered that he flourished in the reigns of the emperors Hadrian, Antoninus Pius, Marcus Aurelius, and Commodus.

GALABAT, GALLABAT, or METEMME, a town in the frontier district of Egypt and Abyssinia, near one of the western sub-tributaries of the Atbara, about 100 miles west of Gondar. Population, 20,000.

GALANGAL, formerly written "galingale," and



sometimes "garingal," *rhizoma galangæ* (German, *Galgantwurzel*; French, *Racine de Galanga*), is an aromatic stimulant drug. Lesser galangal root *radix galangæ minoris*, the ordinary galanga of commerce, is the dried rhizome of *Alpinia officinarum*. Hance, a plant of the natural order *Zingiberaceæ*, growing in the chinese island of Hainan, where it is cultivated, and probably also in the woods of the southern provinces of China.

**GALAPAGOS ISLANDS**, an archipelago of five larger and ten smaller islands, situated in the Pacific Ocean exactly under the equator, about 500 or 600 miles west of Ecuador. The total area is estimated at 2,250 square miles.

The extraordinary number of craters, a few of them still active, "in size from mere spiracles to huge caldrons several miles in circumference," to be found throughout the islands, gives evidence that the archipelago has been the result of volcanic action. Three of the islands are used as penal colonies by the Ecuadorian government.

Though the islands are under the equator, the climate is not intensely hot, as it is tempered by cold currents from the Antarctic Sea.

**GALASHIELS**, a parliamentary burgh and manufacturing town of Scotland, built on both sides of the river Gala, about a mile above its confluence with the Tweed, and thirty-three miles south of Edinburgh.

**GALATIA**, afterward called also **GALLO-GRÆCIA**, in ancient geography an inland division of Asia Minor, bounded on the north by Bithynia and Paphlagonia, east by Pontus, south by Cappadocia and Lycaonia, west by Phrygia.

**GALATIANS, EPISTLE TO THE**. Although "Galatia," as a united kingdom under Amyntas, included Pisidia, as well as portions of Lycaonia and Pamphylia, and when constituted a Roman province was further enlarged so that it extended from Taurus to the Euxine, it is safe to assume that the persons to whom the Pauline epistle was addressed were inhabitants of Gallo-græcia, the old name for Eastern Gaul.

**GALATINA**, a town of Italy, in the province and circondario of Lecce, on the road from Otranto to Taranto.

**GALATZ**, or **GALACZ**, a town and port of Roumania, principality of Moldavia, chief town of the district of Covurlin, on the left bank of the Danube (there 2,000 feet wide), between the mouths of the Pruth and Sereth, about eighty-five miles from the Sulina mouth of the Danube, and one hundred and thirty miles northeast of Bucharest, with which it is connected by rail.

**GALBA, SERVIUS SULPICIUS**, a Roman emperor. He came of a noble family, being born 3 B.C. and sixth in direct descent from the great orator of the same name, though unconnected either by birth or adoption with the line of the first six Cæsars. He owed his elevation to the growing power of the prætorians and the discontent of the provincials, weary of Nero's rule, and beginning to assert their independence. For the first half of Nero's reign he lived in retirement, till, in sixty-one, the emperor bestowed on him the province of Hispania Tarraconensis.

The first years of his rule were marked by rigorous discipline and strict justice, which sometimes degenerated into cruelty. It is true that during the later period of his administration he was indolent and apathetic, whether it was that he sought to elude the jealousy of Nero, or, as is more probable, felt the growing infirmities of age. Yet his career, taken as a whole, shows the justice of the common judgment, as reported by Tacitus, that all would have pronounced him fit for empire had he not been emperor indeed. In the spring of

68, Galba was holding an assembly at New Carthage when the news reached him of the insurrection in Gaul. The appeal of Vindex, urging him to assume the championship of the oppressed human race, placed Galba in an awkward dilemma, and his decision was prompted not so much by ambition as by fear of Nero, whom he knew to be plotting his death. The fall and suicide of Vindex renewed his hesitation, when the news that Nymphidius Sabinus, the prefect of the prætorians, had declared in his favor, and by large promises in his name carried the troops with him, revived his spirits. Before, he had only dared to call himself the minister of the senate and Roman people; he now assumed the title of Cæsar, and marched straight for Rome. At first he was welcomed by the senate and the party of order, but he was never popular with the soldiers or the people, and he soon forfeited the regard even of his few supporters. He was ruined by his virtues no less than by his vices. He was assassinated by a slave 69 A.D.

**GALBANUM**, a gum-resin, believed to be the product of *Ferula galbaniflua*, Boiss. et. Buhse, and *F. rubricaulis*, Boiss., indigenous to Persia, and perhaps also of other umbelliferous plants. It occurs usually in hard or soft, irregular, more or less translucent and shining lumps, composed of agglutinated drops or tears, or occasionally in separate tears, and is of a light-brown, yellowish, or greenish-yellow color, and has a disagreeable bitter taste, a peculiar, somewhat musky odor, and a specific gravity of 1.212. It is administered medicinally for its antispasmodic, expectorant, and stimulant properties. As an antispasmodic it is considered inferior to asafoetida, but superior to ammoniacum, which, however, is more efficacious as an expectorant in asthma.

**GALE, THEOPHILUS**, a distinguished divine, was born in 1628 at King's Teignmouth, in Devonshire, of which place his father was vicar. He died in 1678.

**GALE, THOMAS**, an eminent classical scholar, was born at Scruton, Yorkshire, in 1636. He was educated at Westminster School and at Trinity College, Cambridge, of which he became a fellow. In 1666 he was appointed regius professor of Greek, in 1672 headmaster of St. Paul's School, in 1676 a fellow of the Royal Society, and also prebendary of St. Paul's, and in 1697 dean of York. He died at York in 1702.

**GALEN, CHRISTOPH BERNHARD VAN**, prince-bishop of Münster, was descended from a noble family in Westphalia, and was born October 15, 1600. After attending the Jesuit college at Münster, and the universities of Cologne, Mainz, Louvain, and Bordeaux, he was engaged in several diplomatic missions. Subsequently he became colonel in the army of the elector Ferdinand of Bavaria, and took part in campaigns against the French and Swiss. On the death of Ferdinand he was chosen prince-bishop of Münster. In 1664 he was chosen, along with the margrave Frederick of Baden, joint administrator of military affairs of the Rhenish alliance in its war against the Turks. After the peace that followed the victory of St. Gotthard, he concluded an alliance with Charles II. of England against the Netherlands. In 1672, in conjunction with France, Galen renewed hostilities against the Netherlands. In the following year he entered into an alliance with the king of Denmark and the elector of Brandenburg against Charles XI. of Sweden. Subsequently he became involved in a war with East Friesland, and only consented to evacuate that territory on payment of a large sum of money. He died at Ahaus, September 19, 1678.

**GALEN, or GALENUS, CLAUDIUS**, called Gallien by Chaucer and other writers of the Middle Ages, the most celebrated of ancient medical writers, was born at Pergamus, in Mysia, about 130 A.D. His father Nicon, from whom he received his early education, is described



as remarkable both for excellence of natural disposition, and for mental culture; his mother, on the other hand, appears to have been a second Xanthippe. In 146 Galen commenced the study of medicine, and in about his twentieth year he left Pergamus for Smyrna, in order to place himself under the instruction of the anatomist and physician Pelops, and of the peripatetic philosopher Albinus. He subsequently visited other cities, and in 158 returned from Alexandria to Pergamus. In 164 he went for the first time to Rome. In Rome Galen remained for some years, greatly extending his reputation as a physician, and writing some of his most important treatises. It would appear that he eventually betook himself to Pergamus, after spending some time at the island of Lemnos, where he learned the method of preparing a certain popular medicine, the "terra lemnia," or "sigillata." Whether he ever revisited Rome is uncertain, as also are the time and place of his death. According to Suidas, he died at the age of seventy, or in the year 200, in the reign of Septimius Severus. If, however, we are to trust the testimony of Abul-faraj, one of his Arabian biographers, his decease took place in Sicily, when he was in his eightieth year.

GALENA, or LEAD-GLANCE, a mineral which is essentially a sulphuret of lead, the proportions being 13.3 sulphur and 86.7 lead; but usually containing a little silver, and sometimes copper, zinc, antimony, or selenium. It is of a lead-gray color, with a metallic luster, is found massive, or sometimes granular, or crystallized, in cubes or octahedrons. It is very easily broken, and its fragments are cubical. It occurs in veins, beds, and imbedded masses, often accompanying other metallic ores, in primitive and secondary rocks, but most of all in what is known as transition or mountain limestone. It is found abundantly in Northwestern Illinois, Southwestern Wisconsin, and elsewhere.

GALENA, the county seat of Jo Daviess county, Ill., lying on the Galena river. It is surrounded by lead mines, and is of considerable importance as a trade center. It has railroad, banking and telegraph facilities, and a population of 6,406 (census 1890). It was the home of Gen. U. S. Grant at the beginning of the Civil War. A monument to Gen. Grant was erected there in the public park in May, 1891.

GALESBURG, the county seat of Knox county, Ill., is an important railroad center. It has a large trade with the contiguous district, and is the seat of two colleges and several other educational institutions. Its banking and telegraph facilities are ample, and its population now (1890) numbers 15,264. It has extensive manufactories of wagons and agricultural implements, and large railroad machine shops.

GALIANI, FERDINANDO, one of the most celebrated, if not one of the soundest, political economists of Italy, was born at Chieti on December 2, 1728. Galiani gave early promise of distinction as an economist, and even more as a wit. At the age of twenty-two he had produced two works by which his name became widely known far beyond the bounds of his own Naples. His taste for economic studies had been developed in the society of such men as Genovesi and Intieri, and prompted the composition of his *Trattato della Moneta*, in which many aspects of the question of exchange are set forth, always with a special reference to the state of confusion then presented by the whole monetary system of the Neapolitan government. Galiani's fame as a humorist dated from the appearance of the *Raccolta in Morte del Boia*. He died October 30, 1787.

GALICIA, in German *Galizien*, and in Polish *Halicz*, a crown-land of Austria which comprises the old kingdoms of Galicia and Lodomeria, the duchies of Auschwitz and Zator, and the grand-duchy of Cracow.

About a third of the whole area of Galicia is occupied by the Carpathians, and the greater proportion of the remainder consists of the terraces by which the mountain system gradually sinks down to the great eastern plains of Russia. Only a very small district near the Vistula can properly be described as lowland. The two most prominent summits of the Galician Carpathians are the Babia Gora or Women's Mountain, 5,648 feet above the level of the sea, and the Waxmundska, 7,189. Of the famous massif of the Tatra, hardly a fourth is within the Galician boundaries.

By its rivers Galicia belongs partly to the basin of the Baltic and partly to the basin of the Black Sea. The Dunajec, the San, and the Premeza, tributaries of the Vistula, are the navigable streams of the western region; and the Dniester, which is the principal river of the east, is navigable as far as Czartoria. There are few lakes in the country except mountain tarns; but considerable morasses exist about the Upper Dniester, the Vistula, and the San, and the ponds or dams in the Podolian valleys are estimated to cover an area of 208 square miles. Of the thirty-five mineral springs which can be counted in Galicia, the most frequented are Konopowka, south of Tarnopol, and Lubian and Sklo, west of Lemberg. The last is a good example of the intermittent class. The population is nearly 7,000,000.

GALICIA (Gallæcia or Callæcia), an ancient kingdom, countship, or province in the northwest angle of Spain, now divided into the provinces of Coruña, Lugo, Orense and Pontevedra.

GALILEE, the most northerly of the three provinces into which Palestine was at the Roman period divided, was bounded on the east by the Jordan, on the south by Samaria, on the west by the Mediterranean, on the northwest by Phœnicia and on the north by the Leontes, the extreme length being about sixty miles, the extreme breadth thirty, and the area one thousand square miles. The Galilee thus defined, however, though doubtless the Galilee of Herod's tetrarchy and of later centuries, was hardly that of ordinary parlance at the beginning of the Christian era. Josephus himself, while substantially giving these boundaries, yet incidentally in one place speaks of Upper Galilee as constituting the whole of Galilee proper, and elsewhere in giving Xaloth and Dabaratta as boundary towns, seems to exclude from Galilee the plain of Esdraelon.

The population of Galilee is mixed. In Lower Galilee the peasants are principally Moslem, with a sprinkling of Greek Christians round Nazareth, which is a Christian town. In Upper Galilee, however, there is a mixture of Jews and Maronites, Druses and Moslems (natives or Algerine settlers), while the slopes above the Jordan are inhabited by wandering Arabs. The Jews are engaged in trade, and the Christians, Druses and Moslems in agriculture; and the Arabs are an entirely pastoral people.

The antiquities of Galilee include cromlechs and rude stone monuments, rock-cut tombs, and wine-presses, with numerous remains of Byzantine monasteries and fine churches of the time of the crusades. There are also remains of Greek architecture in various places, but the most interesting buildings are the ancient synagogues. These have not been found in other parts of Palestine, but in Galilee eleven examples are now known. They are rectangular, with the door to the south, and three rows of columns forming four aisles east and west. The architecture is a peculiar and debased imitation of classic style, attributed by architects to the second century of our era. The builder of the examples at Kefr Birim, el Jish, and Meirûn is known to have been the famous Simeon bar Jochai, who lived about 150 A.D., and built twenty-four synagogues in Galilee. The similarity of



style renders it probable that the other examples at Tell Hûm, Kerâzeh, Nebartein, Umm el 'Amed, and Sufsâf were also his work. Both at el Jish and at Kefr Birim there are two synagogues, large and small. At Irbid, above Tiberias, is another synagogue of rather different character, which is said to have been built by Rabbi Nitai. Traces of synagogues have also been found on Carmel, and at Tireh, west of Nazareth. It is curious to find the representation of various animals in relief on the lintels of these buildings. Hebrew inscriptions also occur, and the carved work of the cornices and capitals is very rich. These synagogues were erected at a time when the Galilean Jews were flourishing under the Roman empire, and when Tiberias was the central seat of Jewish learning and of the Sanhedrin.

**GALILEE, THE SEA OF**, with its surrounding shores, deserves a more special description than that given of the rest of the district, as being the part of Palestine which most interests modern students and travelers. The lake was also called the Sea of Chinnereth or Chinneroth, and the Lake of Gennesaret or Tiberias; and by Pliny it is said to have been once called Lake of Taricheæ. In form it is pear-shaped, twelve and a half English miles in length, and seven and a half at its greatest width. The level is now known to be 682.5 feet below the Mediterranean. The water is fresh and clear, and large shoals of fish abound in it. The formation of the lake basin occurred later than the Chalk period, and was due to a subsidence of the strata, which appears to have been sudden and violent, and probably accompanied by extensive volcanic eruptions from three centers east, west and north of the lake. The district has always been liable to volcanic disturbance and to earthquakes. In 1837 Safed and Tiberias were destroyed by earthquake, and the temperature of the hot springs round the lake was then observed to rise considerably for a time.

The Sea of Galilee is best seen from the top of the western precipices, and presents a desolate appearance. On the north the hills rise gradually from the shore, which is fringed with oleander bushes and indented with small bays. The ground is here covered with black basalt. On the west the plateau of el Ahma terminates in precipices 1,700 feet above the lake, and over these the black rocky tops called "the Horns of Hattin" are conspicuous objects. On the south is a broad valley through which the Jordan flows. On the east are furrowed and rugged slopes, rising to the great plateau of the Jaulân (Gaulonitis). The Jordan enters the lake through a narrow gorge between lower hills. A marshy plain, two and a half miles long and one and a half broad, called el Batîhah, exists immediately east of the Jordan inlet. There is also on the west side of the lake a small plain called el Ghuweir, formed by the junction of three large valleys. It measures three and a quarter miles along the shore, and is one mile wide. This plain, naturally fertile, but now almost uncultivated, is recognized to be the plain of Gennesareth, described by Josephus. The shores of the lake are of fine shingle. On the east the hills approach in one place within forty feet of the water, but there is generally a width of about three-quarters of a mile from the hills to the beach. On the west the flat ground at the foot of the hills has an average width of about two hundred yards. A few scattered palms dot the western shores, and a palm grove is to be found near Kefr Hârib on the southeast. Thermal springs are found on each side of the lake, with an average temperature of about 80° Fahr. The hot baths south of Tiberias include seven springs, the largest of which has a temperature of 137° Fahr. The plain of Gennesareth, with its environs, is the best

watered part of the lake-basin. North of this plain are the five springs of el Tâbghah, the largest of which was inclosed about a century ago by Aly, son of Dhahr el 'Amr, in an octagonal reservoir, and the water led off by an aqueduct fifty-two feet above the lake. The Tâbghah springs, though abundant, are warm and brackish. At the north end of the plain is 'Ain el Tîneh ("spring of the fig-tree"), also a brackish spring with a good stream; south of the plain is 'Ain el Bârdeh ("the cold spring"), which is sweet, but scarcely lower in temperature than the others. The most important spring remains still to be noticed, namely, 'Ain el Madâwerah ("the round spring"), situated one mile from the south end of the plain and half a mile from the shore. The water rises in a circular well thirty-two feet in diameter, and is clear and sweet, with a temperature of 73° Fahr. The bottom is of loose sand, and the fish called coracinus by Josephus is here found in abundance. Doctor Tristram was the first explorer to identify this fish, and points out that it could not exist in the other springs. We are thus able to identify the "round spring" with the fountain of Capharnaum, which, according to Josephus, watered the plain of Gennesareth.

**GALILEO.** Galileo Galilei, one of the earliest and greatest of experimental philosophers, was born at Pisa, February 18, 1564. From his earliest childhood Galileo was remarkable for intellectual aptitude, as well as for mechanical invention. His favorite pastime was the construction of toy machines, not the less original and ingenious that their successful working was usually much hindered by the scarcity of suitable materials. His application to literary studies was equally conspicuous. In the monastery of Vallombrosa, near Florence, where his education was principally conducted, he not only made himself acquainted with the best Latin authors, but acquired a fair command of the Greek tongue, thus laying the foundation of the brilliant and elegant style for which his writings were afterward distinguished. From one of the monks he also received instruction in logic, according to the system then in vogue; but the futilities of the science revolted, while its subtleties failed to interest his understanding, and he was soon permitted to abandon a study so distasteful to him. A document published by M. Selmi in 1864 proves that he was at this time so far attracted toward a religious life as to have joined the novitiate of the order; but his father, who had other designs for him, seized the opportunity of an attack of ophthalmia to withdraw him permanently from the care of the monks. Having had personal experience of the unremunerative character both of music and of mathematics, he desired that his son should apply himself to the more profitable study of medicine, and, not without some straining of his slender resources, placed him, before he had completed his eighteenth year, at the university of Pisa. He accordingly matriculated, November 5, 1581, and immediately entered upon attendance at the lectures of the celebrated physician and botanist, Andrea Cesalpino.

The natural gifts of the young student, not less multifarious than those of an earlier Tuscan prodigy, Leonardo da Vinci, seemed at this time equally ready to develop in any direction toward which choice or hazard might incline them. In musical skill and invention he already vied with the best professors of the art in Italy; his personal taste would have led him to choose painting as his profession, and one of the most eminent artists of his day, Lodovico Cigoli, owned that to his judgment and counsel he was mainly indebted for the success of his works; his wit and eloquence gave promise that he would one day add to the literary glories of his country; while his mathematical



and mechanical genius only awaited a suitable opportunity for full display and development. In 1583, while watching the vibrations of the great bronze lamp still to be seen swinging from the roof of the cathedral of Pisa, he observed that, whatever the range of its oscillations, they were invariably executed in equal times. The experimental verification of this fact led him to the important discovery of the isochronism of the pendulum. He at first applied the new principle to pulse-measurement, and more than fifty years later turned it to account in the construction of an astronomical clock. Up to this time he was entirely ignorant of mathematics, his father having carefully held him aloof from a study which he rightly apprehended would lead to his total alienation from that of medicine. Accident, however, frustrated this purpose. A lesson in geometry, given by Ostilio Ricci to the pages of the grand-ducal court, then temporarily resident at Pisa, chanced to have Galileo for an unseen listener; his attention was riveted, his dormant genius was roused, and he threw all his energies into the new pursuit thus unexpectedly presented to him. With Ricci's assistance, he rapidly mastered the elements of the science, and eventually extorted his father's reluctant permission to exchange Hippocrates and Galen for Euclid and Archimedes. In 1586 he was withdrawn from the university, through lack of means, before he had taken a degree, and returned to Florence, where his family habitually resided. We next hear of him as lecturing before the Florentine Academy on the site and dimensions of Dante's *Inferno*; and he shortly afterward published an essay descriptive of his invention of the hydrostatical balance, which rapidly made his name known throughout Italy. His first patron was the Marchese Guidubaldo del Monte of Pesaro, a man eminent for his scientific attainments, as well as influential by his family connections. At his request he wrote, in 1588, a treatise on the center of gravity in solids, which obtained for him, together with the title of "the Archimedes of his time," the honorable though not lucrative post of mathematical lecturer at the Pisan university. During the ensuing two years (1589-91) he carried on that remarkable series of experiments, by which he established the first principles of dynamical science, and by which he earned for himself the undying hostility of the bigoted Aristotelians of that day. From the leaning tower of Pisa he afforded to all the professors and students of the university ocular demonstration of the falsehood of the Peripatetic dictum that heavy bodies fall with velocities proportional to their weights, and with unanswerable logic demolished all the time-honored maxims of the schools regarding the motion of projectiles, and elemental weight or levity. But while he convinced, he failed to conciliate his adversaries. The keen sarcasm of his polished rhetoric was not calculated to soothe the susceptibilities of men already smarting under the deprivation of their most cherished illusions. He seems, in addition, to have compromised his position with the grand-ducal family by the imprudent candor with which he condemned a machine for clearing the port of Leghorn, invented by Giovanni de' Medici, an illegitimate son of Cosmo I. Princely favor being withdrawn, private rancor was free to show itself. He was publicly hissed at his lecture, and found it prudent to resign his professorship and withdraw to Florence in 1591. Through the death of his father in July of that year family cares and responsibilities devolved upon him as eldest son, and thus his nomination to the chair of mathematics at the university of Padua, secured by the influence of the Marchese Guidubaldo with the Venetian senate, was welcome, as affording a relief from pecuniary embar-

rassment, no less than as opening a field for scientific distinction.

His residence at Padua, which extended over a period of eighteen years, from 1592 to 1610, was a course of uninterrupted prosperity. His appointment was three times renewed, on each occasion with expressions of the highest esteem on the part of the governing body, and his yearly salary was progressively raised from 180 to 1,000 florins. His lectures were attended by persons of the highest distinction from all parts of Europe, and such was the charm of his demonstrations that a hall capable of containing 2,000 people had eventually to be assigned for the accommodation of the overflowing audiences which they attracted. His ingenious invention of the proportional compasses—an instrument still used in geometrical drawing—dates from 1597; and about the same time he constructed the first thermometer, consisting of a bulb and tube filled with air and water, and terminating in a vessel of water. In this instrument, the results of varying atmospheric pressure were not distinguishable from the expansive and contractive effects of heat and cold, and it became an efficient measure of temperature only when Rinieri, in 1646, introduced the improvement of hermetically sealing the liquid in glass. The substitution, in 1670, of mercury for water completed the modern thermometer.

Galileo seems, at an early period of his life, to have adopted the Copernican theory of the solar system, and was deterred from avowing his opinions—as is proved by his letter to Kepler of August 4, 1597—by the fear of ridicule rather than of persecution. The appearance, in September, 1604, of a new star in the constellation Serpentarius, afforded him indeed an opportunity, of which he eagerly availed himself, for making an onslaught upon the Aristotelian axiom of the incorruptibility of the heavens; but he continued to conform his public teachings in the main to Ptolemaic principles, until the discovery of a novel and potent implement of research placed at his command startling and hitherto unsuspected evidence as to the constitution and mutual relations of the heavenly bodies. Galileo was not the original inventor of the telescope. That honor must be assigned to Hans Lippershey, an obscure optician of Middleburg, who, on October 21, 1608, offered to the states of Holland three instruments by which the apparent size of remote objects was increased. But here his glory ends, and that of Galileo begins. The rumor of the new invention, which reached Venice in April or May, 1609, was sufficient to set the Italian philosopher on the track; and after one night's profound meditation on the principles of refraction, he succeeded in producing a telescope of threefold magnifying power. Upon this first attempt he rapidly improved, until he attained to a power of thirty-two, and his instruments, of which he manufactured hundreds with his own hands, were soon in request in every part of Europe. Two lenses only—a plano-convex and a plano-concave—were needed for the composition of each, and this simple principle is that still employed in the construction of opera-glasses. Galileo's direction of his new instrument to the heavens formed an era in the history of astronomy. Discoveries followed upon it with astounding rapidity and bewildering variety. The *Sidereus Nuncius*, published at Venice in the early part of 1610, contained the first fruits of the new mode of investigation, which were sufficient to startle and surprise the learned on both sides of the Alps. The mountainous configuration of the moon's surface was there first described, and the so-called "phosphorescence" of the dark portion of our satellite attributed to its true cause—namely, illumination by sun-light reflected from the earth. All the time-worn fables and conjectures regarding the compo-



sition of the Milky Way were at once dissipated by the simple statement that to the eye, reënforced by the telescope, it appeared as a congeries of lesser stars, while the great nebulae were equally declared to be resolvable into similar elements. But the discovery which was at once perceived to be most important in itself, and most revolutionary in its effects, was that of Jupiter's satellites, first seen by Galileo January 7, 1610, and by him named *Sidera Medicea*, in honor of the grand-duke of Tuscany, Cosmo II., who had been his pupil, and was about to become his employer. An illustration is, with the general run of mankind, more powerful to convince than an argument; and the cogency of the visible plea for the Copernican theory offered by the miniature system, then for the first time disclosed to view, was recognizable in the triumph of its advocates, as well as in the increased acrimony of its opponents.

In September, 1610, Galileo finally abandoned Padua for Florence. His researches with the telescope had been rewarded by the Venetian senate with the appointment for life to his professorship, at an unprecedentedly high salary. His discovery of the "Medicean Stars" was acknowledged by his nomination (July 12, 1610) as philosopher and mathematician extraordinary to the grand-duke of Tuscany. The emoluments of this office, which involved no duties save that of continuing his scientific labors, were fixed at 1,000 scudi; and it was the desire of increased leisure, rather than the promptings of local patriotism, which induced him to accept an offer, the first suggestion of which had indeed come from himself. Before the close of 1610 the memorable cycle of discoveries begun in the previous year was completed by the observation of the ansated or, as it appeared to Galileo, triple form of Saturn (the ring-formation was first recognized by Huygens in 1655), of the phases of Venus, and of the spots upon the sun. Although his priority in several of these discoveries has been contested, inquiry has in each case proved favorable to his claims. In the spring of 1611 he visited Rome, and exhibited in the gardens of the Quirinal Palace the telescopic wonders of the heavens to the most eminent personages at the pontifical court. Encouraged by the flattering reception accorded to him, he ventured, in his *Letters on the Solar Spots*, printed at Rome in 1613, to take up a more decided position toward that doctrine on the establishment of which, as he avowed in a letter to Belisario Vinta, secretary to the grand-duke, "all his life and being henceforward depended." Even in the time of Copernicus some well-meaning persons had suspected a discrepancy between the new view of the solar system and certain passages of Scripture — a suspicion strengthened by the anti-Christian inferences drawn from it by Giordano Bruno; but the question was never formally debated until Galileo's brilliant discoveries, enhanced by his formidable dialectic and enthusiastic zeal, irresistibly challenged for it the attention of the authorities. Although he earnestly deprecated the raising of the theological issue, and desired nothing better than permission to pursue unmolested his physical demonstrations, it must be admitted that, the discussion once set on foot, he threw himself into it with characteristic impetuosity, and thus helped to precipitate a decision which it was his ardent wish to avert. In December, 1613, a Benedictine monk named Benedetto Castelli, at that time professor of mathematics at the university of Pisa, wrote to inform Galileo of a recent discussion at the grand-ducal table, in which he had been called upon to defend the Copernican doctrine against theological objections. This task Castelli, who was a steady friend and disciple of the Tuscan astronomer, seems to have discharged with moderation and success. Galileo's answer, written, as he said himself, *currente calamo*, was

an exposition of a formal theory as to the relations of physical science to Holy Writ, still further developed in an elaborate apology addressed by him in the following year (1614) to Christina of Lorraine, dowager grand-duchess of Tuscany. Not satisfied with explaining adverse texts, he met his opponents with unwise audacity on their own ground, and endeavored to produce scriptural confirmation of a system which to the ignorant many seemed an incredible paradox, and to the scientific few was a beautiful but daring innovation. The rising agitation on the subject which, originating probably with the sincere upholders of the integrity of Scripture, was fomented for their own purposes by the rabid Aristotelians of the schools, was heightened rather than allayed by these manifestoes, and on the fourth Sunday of the following Advent found a voice in the pulpit of Santa Maria Novella. Padre Caccini's denunciation of the new astronomy was indeed disavowed and strongly condemned by his superiors; nevertheless, on February 5, 1615, another Dominican monk named Lorini laid Galileo's letter to Castelli before the Inquisition.

Cardinal Robert Bellarmine was at that time by far the most influential member of the Sacred College. He was a man of vast learning and upright piety; but, although personally friendly to Galileo, there is no doubt that he saw in his scientific teachings a danger to religion. The year 1615 seems, however, to have been a period of suspense. Galileo received, as the result of a conference between Cardinals Bellarmine and Del Monte, a semi-official warning to avoid theology, and limit himself to physical reasoning. "Write freely," he was told by Monsignor Dini, "but keep outside the sacristy." Unfortunately, he had already committed himself to dangerous ground. In December he repaired personally to Rome, full of confidence that the weight of his arguments and the vivacity of his eloquence could not fail to convert the entire pontifical court to his views. He was cordially received, and eagerly listened to, but his imprudent ardor served but to injure his cause. On February 24, 1616, the consulting theologians of the Holy Office characterized the two propositions — that the sun is immovable in the center of the world, and that the earth has a diurnal motion of rotation — the first as "absurd in philosophy, and formally heretical, because expressly contrary to Holy Scripture," and the second as "open to the same censure in philosophy, and at least erroneous as to faith." Two days later Galileo was, by command of the pope (Paul V.), summoned to the palace of Cardinal Bellarmine, and there officially admonished not thenceforward to "hold, teach, or defend" the condemned doctrine. This injunction he promised to obey. On March 5th the Congregation of the Index issued a decree reiterating, with the omission of the word "heretical," the censure of the theologians, suspending, *usque corrigatur*, the great work of Copernicus *De Revolutionibus orbium celestium*, and absolutely prohibiting a treatise by a Carmelite monk named Foscarini, which treated the same subject from a theological point of view. At the same time it was given to be understood that the new theory of the solar system might be held *ex hypothesi*, and the trivial verbal alterations introduced into the Polish astronomer's book in 1620, when the work of revision was completed by Cardinal Gaetani, confirmed this interpretation. This edict, it is essential to observe, of which the responsibility rests with a disciplinary congregation in no sense representing the church, was never confirmed by the pope, and was virtually repealed in 1757 under Benedict XIV.

Galileo returned to Florence three months later, not ill-pleased, as his letters testify, with the result of his



visit to Rome. He brought with him, for the refutation of calumnious reports circulated by his enemies, a written certificate from Cardinal Bellarmine, to the effect that no abjuration had been required of or penance imposed upon him. During a prolonged audience he had received from the pope assurances of private esteem and personal protection; and he trusted to his dialectical ingenuity to find the means of presenting his scientific convictions under the transparent veil of an hypothesis. Although a sincere Catholic, he seems to have laid but little stress on the secret admonition of the Holy Office, which his sanguine temperament encouraged him gradually to dismiss from his mind. He preserved no written memorandum of its terms, and it was represented to him, according to his own deposition in 1633, solely by Cardinal Bellarmine's certificate, in which, for obvious reasons, it was glossed over rather than expressly recorded. For seven years, however, during which he led a life of studious retirement in the Villa Segni at Bellosguardo, near Florence, he maintained an almost unbroken silence. At the end of that time he appeared in public with his *Saggiatore*, a polemical treatise written in reply to the *Libra Astronomica* of Padre Grassi (under the pseudonym of Lotario Sarsi), the Jesuit astronomer of the Collegio Romano. The subject in debate was the nature of comets, the conspicuous appearance of three of which bodies in the year 1618 furnished the occasion of the controversy. Galileo's views, although erroneous, since he held comets to be mere atmospheric emanations reflecting sunlight after the evanescent fashion of a halo or a rainbow, were expressed with such triumphant vigor, and embellished with such telling sarcasms, that his opponent did not venture upon a reply. The *Saggiatore* was printed at Rome in October, 1623, by the Academy of the Lincei, of which Galileo was a member, with a dedication to the new pope, Urban VIII., and notwithstanding some passages containing a covert defense of Copernican opinions, was received with acclamation by the ecclesiastical, no less than by the scientific authorities. Everything seemed now to promise a close of unbroken prosperity to Galileo's career. Maffeo Barberini, his warmest friend and admirer in the Sacred College, was, by the election of August 8, 1623, seated on the pontifical throne; and the marked distinction with which he was received on his visit of congratulation to Rome in 1624 encouraged him to hope for the realization of his utmost wishes. He received every mark of private favor. The pope admitted him to six long audiences in the course of two months, wrote an enthusiastic letter to the grand-duke praising the great astronomer, not only for his distinguished learning, but also for his exemplary piety, and granted a pension to his son Vincenzo, which was afterward transferred to himself, and paid, with some irregularities, to the end of his life. But on the subject of the decree of 1616, the revocation of which Galileo had hoped to obtain through his personal influence, he found him inexorable. Nevertheless, the sanguine philosopher trusted, not without reason, that it would at least be interpreted in a liberal spirit, and his friends encouraged his imprudent confidence by eagerly retailing to him every papal utterance which it was possible to construe in a favorable sense. To Cardinal Hohenzollern Urban was reported to have said that the theory of the earth's motion had not been and could not be condemned as heretical, but only as rash; and in 1630 the learned Dominican monk Campanella wrote to Galileo that the pope had expressed to him in conversation his disapproval of the prohibitory decree. Thus, in the full anticipation of added renown, and without any misgiving as to the ulterior consequences, Galileo set himself, on his return to Florence,

to complete his famous but ill-starred work, the *Dialogo dei due Massimi Sistemi del Mondo*. Finished in 1630, it was not until January, 1632, that it emerged from the presses of Landini at Florence. The book was originally intended to appear in Rome, but unexpected obstacles interposed. The Lyncean Academy collapsed with the death of Prince Federigo Cesi, its founder and president; an outbreak of plague impeded communication between the various Italian cities; and the *imprimatur* was finally extorted, rather than accorded, under the pressure of private friendship and powerful interest. A tumult of applause from every part of Europe followed its publication; and it would be difficult to find in any language a book in which animation and elegance of style are so happily combined with strength and clearness of scientific exposition. Three interlocutors, named respectively Salviati, Sagredo and Simplicio, take part in the four dialogues of which the work is composed. The first-named expounds the views of the author; the second is an eager and intelligent listener; the third represents a well-meaning but obtuse Peripatetic, whom the others treat at times with undisguised contempt. Salviati and Sagredo took their names from two of Galileo's early friends, the former a learned Florentine, the latter a distinguished Venetian gentleman; Simplicio ostensibly derived his from the Cilician commentator of Aristotle, but the choice was doubtless instigated by a sarcastic regard to the double meaning of the word. There were not wanting those who insinuated that Galileo intended to depict the pope himself in the guise of the simpleton of the party; this charge, however, was not only preposterous in itself, but wholly unsupported by intrinsic evidence, and Urban was far too sagacious to give any permanent credit to it.

It was at once evident that the whole tenor of this remarkable work was in flagrant contradiction with the edict passed sixteen years before its publication, as well as with the author's personal pledge of conformity to it. The ironical submission with which it opened, and the assumed indetermination with which it closed, were hardly intended to mask the vigorous assertion of Copernican principles which formed its substance. It is a singular circumstance, however, that the argument upon which Galileo mainly relied as furnishing a physical demonstration of the truth of the new theory rested on a misconception. The ebb and flow of the tides, he asserted, were a visible effect of the terrestrial double movement, since they resulted from the inequality of the absolute velocities through space of the various parts of the earth's surface, produced by the motion of rotation. To this notion, which took its rise in a confusion of thought, he attached capital importance, and he treated with scorn Kepler's suggestion that a certain occult attraction of the moon was in some way concerned in the phenomenon. The theological censures which the book did not fail to incur were not slow in making themselves felt. Toward the end of August the sale was prohibited; on October 1st, the author was cited to Rome by the Inquisition. He pleaded his age, now close upon seventy years, his infirm health, and the obstacles to travel caused by quarantine regulations; but the pope was sternly indignant at what he held to be his ingratitude and insubordination, and no excuse was admitted. At length, on February 13, 1633, he arrived at the residence of Niccolini, the Tuscan ambassador to the pontifical court, and there abode in deep dejection for two months. From April 12th to the 30th, he was detained in the palace of the Inquisition, where he occupied the apartments of the fiscal, and was treated with unexampled indulgence. On the 30th he was restored to the hospitality of Niccolini, his warm and generous partisan. The accusation against



him was that he had written in contravention of the decree of 1616, and in defiance of the command of the Holy Office communicated to him by Cardinal Bellarmine; and his defense consisted mainly in a disavowal of his opinions, and an appeal to his good intentions. On June 21st, he was finally examined under menace of torture; but he continued to maintain his assertion that, after its condemnation by the Congregation of the Index, he had never held the Copernican theory. Since the publication of the documents relating to this memorable trial, there can no longer be any doubt, not only that the threat of torture was not carried into execution, but that it was never intended that it should be. On June 22d, in the church of Santa Maria sopra Minerva, Galileo read his recantation, and received his sentence. He was condemned, as "vehemently suspected of heresy," to incarceration at the pleasure of the tribunal, and by way of penance was enjoined to recite once a week for three years the seven penitential psalms. This sentence was signed by seven cardinals, but did not receive the customary papal ratification. The legend according to which Galileo, rising from his knees after repeating the formula of abjuration, stamped on the ground, and exclaimed, "*E pur si muove!*" is, as may readily be supposed, entirely apocryphal. The earliest ascertained authority for it is the seventh edition of an *Historical Dictionary*, published at Caen in 1789. It seems probable that Galileo remained in the custody of the Inquisition from June 21st to the 24th, on which day, he was relegated to the Villa Medici on the Trinità de' Monti. Thence, on July 6th, he was permitted to depart for Siena, where he spent several months in the house of the archbishop, Ascanio Piccolomini, one of his numerous and trusty friends. It was not until December that his earnest desire of returning to Florence was realized, and there, in the Villa Martellini at Arcetri, he spent the remaining eight years of his life in the strict retirement which was the prescribed condition of his comparative freedom.

Domestic afflictions combined with numerous and painful infirmities to embitter his old age. His sister-in-law and her whole family, who came to live with him on his return from Rome, perished shortly afterward of the plague; and on April 1, 1634, died, to the inexpressible grief of her father, his eldest and best-beloved daughter, a nun in the convent of San Matteo, at Arcetri. Galileo was never married; but by a Venetian woman, named Marino Gamba, he had three children—a son who married and left descendants, and two daughters who took the veil at an early age. Notwithstanding this stain on the morality of his early life, which was in some degree compensated by the regularity of his subsequent conduct, Galileo's general character was one which commanded the respect of all who approached him. His prodigious mental activity continued undiminished to the last, nor were his latter years the least profitable to science of his long and eventful career. In 1636 he completed his *Dialoghi delle Nuove Scienze*, in which he recapitulated the results of his early experiments and mature meditations on the principles of mechanics. This, in many respects his most valuable work, was printed by the Elzevirs at Leyden in 1638, and excited admiration equally universal and more lasting than that accorded to his astronomical treatises. His last telescopic discovery—that of the moon's diurnal and monthly librations—was made in 1637, only a few months before his eyes were forever closed in hopeless blindness. It was in this condition that Milton found him when he visited him at Arcetri in 1638. But the fire of his genius was not even yet extinct. He continued his scientific correspondence with unbroken interest and undiminished logical acumen; he

thought out the application of the pendulum to the regulation of clock-work, which Huygens successfully realized seventeen years later; and he was engaged in dictating to his disciples, Viviani and Torricelli, his latest ideas on the theory of impact when he was seized with the slow fever which in two months brought him to the grave. On January 8, 1642, he closed his long life of triumph and humiliation, and the coincidence of the day of his birth with that of Michelangelo's death was paralleled by the coincidence of the year of his death with that of the birth of Isaac Newton.

GALION, the capital of Crawford county, Ohio, is a thriving town of (1890) 6,000 inhabitants. It is situated in the midst of a rich section, and is of considerable commercial importance. It has railroad, banking and telegraph facilities, and is steadily growing.

GALITCH, or HALICZ, a town of Russia, at the head of a district in the government of Kostroma, eighty miles northeast of Kostroma, on the low southeastern shore of Galitch Lake.

GALL, FRANZ JOSEPH, anatomist, physiologist, and founder of phrenology, was born at Tiefenbrunn, near Pforzheim, Baden, March 9, 1758. After completing the usual literary course at Baden and Bruchsal, he began the study of medicine under Hermann at Strasburg, whence, attracted by the names of Van Swieten and Stoll, he removed to Vienna in 1781. Having received his diploma, he began to practice as a physician there in 1785; but his energies were mainly devoted to the scientific investigation of problems which, even from boyhood, had been occupying his attention. At a comparatively early period he had formed a generalization which he believed to be a sound one, that in the human subject at least a powerful memory is invariably associated with prominent eyes; and further observation had enabled him, as he thought, also to define the external characteristics indicative of special talents for painting, music, and the mechanical arts. Following out these researches, he gradually reached the strong personal conviction, not only that the talents and dispositions of men are dependent upon the functions of the brain, but also that they may be inferred with perfect exactitude and precision from the external appearances of the skull. Gall's first appearance as an author was made in 1791, when he published the first two chapters of a (never completed) work entitled *Philosophisch-medizinische Untersuchungen über Natur u. Kunst im kranken u. gesunden Zustande des Menschen*. The first public notice of his inquiries in cranioscopy, however, was in the form of a familiar letter addressed to a friend, which appeared in Wieland's *Deutscher Mercur* in 1798; but two years before this Gall had commenced giving private courses of phrenological lectures in Vienna, where his doctrines soon attracted general attention, and met with increasing success until, in 1802, they were interdicted by the government on the ground that they were dangerous to religion. This step on the part of the authorities had the effect of greatly stimulating public curiosity, and increasing Gall's celebrity. In March, 1805, he finally left Vienna, in company with his friend and associate, Spurzheim, and made a tour through Germany, in the course of which he lectured in Berlin, Dresden, Magdeburg, and several of the university towns. These expositions, which he knew how to make popular and attractive, were much resorted to by the public, and excited considerable controversy in the scientific world. He had almost reached the zenith of his fame when, in 1807, he repaired to Paris and established himself there as a medical practitioner, at the same time continuing his activity as a lecturer and writer. In 1808 appeared his *Introduction au cours de physiologie du cerveau*, which was followed in 1809 by the *Recherches sur le*



*système nerveux en général et sur celui du cerveau en particulier* (originally laid before the Institute of France in March, 1808), and in 1810 by the first installment of the *Anatomie et Physiologie du système nerveux en général, et du cerveau en particulier, avec des observations sur la possibilité de reconnaître plusieurs dispositions intellectuelles et morales de l'homme et des animaux par la configuration de leurs têtes*. The *Recherches* and the first two volumes of the *Anatomie*, bear the conjoint names of Gall and Spurzheim. The latter work was completed in 1819, and appeared in a second edition of six 8vo volumes shortly afterward (1822-25). In 1811 he replied to a charge of Spinozism or atheism, which had been strongly urged against him in certain quarters, by a treatise entitled *Des dispositions innées de l'âme et de l'esprit*, which he afterward incorporated with his greater work. In 1819 he became a naturalized French subject, but his efforts two years afterward to obtain admission to the Academy of Sciences, although supported by Geoffroy St. Hilaire, were unsuccessful. In 1823 he visited London with the intention of giving a series of phrenological lectures, but was disappointed of the reception he had anticipated, and speedily abandoned his plans. He continued to lecture and practice in Paris until the beginning of 1828, when he was disabled by an apoplectic seizure. His death took place at Montrouge, near Paris, on August 22, 1828. The *Anatomie* has been translated into English by Lewis (Boston, Mass., 1835).

GALLAND, ANTOINE, Orientalist and archæologist, the first European translator of the *Arabian Nights*, was born in 1646, at Rollot, in the department of Somme. He died February 17, 1715.

GALLARATE, a flourishing town of Italy, the head of a circle in the province of Milan, situated on the railway twenty-three miles northwest of Milan at the junction of the line running north to Varese.

GALLAS, or more correctly GALLA, a powerful race of eastern Africa, scattered over the wide region which extends for about 1,000 miles from the interior of Abyssinia to the neighborhood of the river Sabacki, in 3° 12' of S. latitude. Almost nothing has been definitely ascertained about the early homes and migrations of the race; but it appears to have occupied the southern portion of its present territory for nearly four centuries at least.

GALLATIN, ALBERT, American statesman, was born in Geneva, Switzerland, January 29, 1761. He was left an orphan at the age of nine years, and his early training devolved upon his grandparents, and an intimate friend, Mlle. Pictet. He received a thorough education and was graduated in 1779, standing well in his classes. In 1780 he emigrated to the United States in company with a friend, and they at once proceeded to New England, where they engaged in business. Having failed in this venture, Gallatin entered Harvard College as a French teacher, in which occupation he met with some success; but becoming disgusted with the manners and customs of the New Englanders, he again changed his place of residence and his business, going to Pennsylvania and Virginia, where he engaged in land speculation.

In 1793 he was elected U. S. senator from Pennsylvania by a mixed vote, but his election was annulled by the Senate on account of defective citizenship. He at once returned to Pennsylvania, where he took part in the whisky rebellion, at first exciting the distillers to resist the imposition of the tax, but exerting himself to the utmost to prevent bloodshed when he saw such a contingency among the probabilities. It was due to him alone that bloodshed was prevented at Old Redstone Fort in August, 1794, on which occasion the govern-

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GALLE, or POINT DE GALLE, a town and port in the southern portion of Ceylon, on the southwestern coast, about seventy-two miles south of Colombo, with which it is connected by a good carriage road. It was made a municipality in 1865, and divided into the five districts of the Fort, Callowelle, Galopiadde, Hirimbure, and Cumbalwalla. Population, 50,000.

GALLIC ACID, trioxybenzoic acid, or dioxysalicylic acid, the *acidum gallicum* of pharmacy, is a substance discovered by Scheele, which exists as such in the leaves of the bearberry, in pomegranate root-bark, and in tea, in gall-nuts to the extent of about three per cent., and in other vegetable productions.

Gallic acid has been advantageously employed as an internal medicinal agent in scarlatinal albuminuria, in which its effect appears to be due to an astringent and tonic action on the inflamed capillaries of the kidneys; in other forms of albuminuria; in cases of chyluria, in which, as not causing nausea and headache, it is preferable to tannic acid, and in pyrosis, diarrhœa, some forms of dysentery, and tabes and rickets, and atonic states of the alimentary canal and of the body generally. In checking the night-sweats of phthisis it has been found of especial service. As a hæmostatic, when administered internally, it has proved of value in hæmate-



mesis, epistaxis, fungus hæmatodes, menorrhagia, and more particularly in hæmaturia.

GALLIENUS, P. LICINIUS, a Roman emperor, son of the emperor Valerian, was born about 218. From 253 to 260 he reigned conjointly with his father, and gave proof of both bravery and ability, especially in the defeat near Milan of 300,000 Alemanni, with a force of only 10,000 Romans. Gallienus was killed at Milan in 268 while besieging Aureolus, who had been proclaimed emperor by the Illyrian legions.

GALLINACEOUS BIRDS (Lat. *gallus*, a cock), or RASORES (Lat. scrapers), an order of birds, more generally valuable to man than any other order, containing at once the most important species domesticated as poultry, and those most sought after as game. The common domestic fowl may be regarded as the type of the order. Like it, the gallinaceous birds in general have a small head; a rather short bill, with the upper mandible arched; nostrils placed on the sides of the bill, and usually in a soft membranous space at its base; the figure bulky; the wings short, and not governed by powerful muscles, nor adapted for long or rapid flight; the feet with three toes before, and one behind—which is articulated higher than the others, and is sometimes wanting—adapted for walking on the ground, and for scraping, in order to procure food; the digestive organs complex, the crop large, the gizzard muscular, the intestine long, with two very large *cæca*. The order includes guans, pheasants, grouse, partridges, quails, ptarmigans, peacocks, turkeys, guinea-fowls, tragopans, and tinamous.

GALLINULE. See MOORHEN.

GALLIO, JUNIUS ANNÆUS, proconsul or “deputy” of Achaia at the time of the apostle Paul’s first visit to Corinth (53 A.D.), was the son of M. Andæus Seneca, a Roman eques and rhetorician, and was born at Cordova about the beginning of the Christian era. He was appointed proconsul under Claudius. In the fifth year of Nero we hear of him as having been again in Rome.

GALLIPOLI, a seaport town of Turkey in Europe, in the province of Rumili and vilayet of Edirneh, at the northeast extremity of the Straits of Dardanelles, on a narrow peninsula 130 miles southwest of Constantinople, and ninety miles due south of Adrianople. Population, 30,000.

GALLIPOLI, an important seaport town of Italy, in the province of Lecce, and about twenty-five miles northeast of the city of that name, beautifully situated on a rocky islet on the east shore of the Gulf of Taranto, and connected by a long stone bridge of twelve arches with the suburb of Lizza on the mainland.

GALLIPOLIS, the county seat of Gallia county, Ohio, is a thriving town with railroads, banks, and telegraphs. It has considerable traffic and a population steadily increasing—now (1890) numbering 4,550.

GALLIUM, so called in honor of France (Gallia), symbol Ga, atomic weight 69.9, a metal discovered August 27, 1875, by M. Lecoq de Boisbaudran, in the spectroscopic examination of zinc-blende from Pierrefitte in the valley of Argeles, Hautes Pyrénées, and since found to exist in blende from several other localities, notably in that of the mines of Lüdrieh and Apfel at Bensberg, on the Rhine, which contains nearly sixteen milligrams per kilogram. Its density and approximate atomic weight, and other of its characters, were predicted by Mendeljeff.

GALLOWAY, THOMAS, a Scottish mathematician, was born at Symington, in the upper ward of Lanarkshire, February 27, 1796. After receiving such education as the schools of his own and adjoining parishes could give, he entered in 1812 the University of Edin-

burgh, where he distinguished himself specially in mathematics. In 1823 he was appointed one of the teachers of mathematics at the military college of Sandhurst, and on the death of Sir John Leslie, in 1832, he was an unsuccessful candidate for the vacant chair of natural philosophy in Edinburgh. In the following year he was appointed actuary to the Amicable Life Assurance Office, the oldest institution of that kind in London, and in this situation he remained till his death, November 1, 1851. Galloway was a voluminous though, for the most part, an anonymous writer, and took a leading part in the proceedings of the principal scientific societies of London.

GALLS. In animals galls occur mostly on or under the skin of living mammals and birds, and are produced by Acaridea, and by dipterous insects of the genus *Cestrus*. Signor Moriggia has described and figured a horny excrescence, nearly eight inches in length, from the back of the human hand, which was caused by *Acarus domesticus*. What are commonly known as galls, are vegetable deformities or excrescences, due to parenchymatous hypertrophy, and, according to the definition of Lacaze-Duthiers, comprise “all abnormal vegetable productions developed on plants by the action of animals, more particularly by insects, whatever may be their form, bulk, or situation.” For the larvæ of their makers the galls provide shelter and sustenance.

Galls are formed by insects of several orders. Among the Hymenoptera are the gall-wasps (*Cynips* and its allies), which infest the various species of oak. They are small insects, having straight antennæ, and a compressed, usually very short abdomen, with the second, or second and third segments greatly developed, and the rest imbricated, and concealing the partially coiled ovipositor. The transpositions from the larval state are completed within the gall, out of which the imago, or perfect insect, tunnels its way, usually in autumn, though sometimes, as has been observed of some individuals of *Cynips Kollari*, after hibernation.

GALLUPPI, PASQUALE, a distinguished Italian philosopher, was born on April 2, 1770, at Tropea, in Calabria. He was of good family, and after completing his education at the academy of Tropea and the university of Naples he entered the public service, and was for many years employed in the office of the administration of finances. Altogether apart from academic influences he pursued his favorite studies, and it was not till he had reached the age of sixty, and had become widely known by his writings on philosophy, that he was called to a chair in the university of Naples. This chair he held till his death in November, 1846.

GALLUS, C. CORNELIUS, a Roman poet, orator, and politician, was born of humble parents at Forum Julii (Fréjus), in Gaul, about the year 66 B.C. Gallus enjoyed a high reputation among his contemporaries as a man of intellect. He associated on terms of equality with Virgil, Ovid, Varius, Asinius, Pollio, and others, and on account of his four books of elegies Ovid claimed for him the first place among the elegiac poets of Rome. His fame as an orator was hardly inferior to his renown as a poet; but as not a fragment of his composition has descended to our times, we have no means of judging the worth of his literary pretensions, and have to content ourselves with the somewhat partial estimate of his personal friends. He died by suicide 26 B.C.

GALT, a Canadian town in Waterloo county, Province of Ontario, having some commercial importance, railroad, banking and telegraph facilities, etc.; population (1890) of 7,000.

GALT, JOHN (1779–1889), a Scottish novelist, was born at Irvine, in Ayrshire.

Galt, like almost all voluminous writers, was exceed-



ingly unequal. His masterpieces are *The Ayrshire Legatees*, *The Annals of the Parish*, *Sir Andrew Wylie*, *The Entail*, *The Provost*, and *Lawrie Todd*. *The Ayrshire Legatees* gives, in the form of a number of exceedingly diverting letters, the adventures of the Rev. Dr. Pringle and his family in London. The letters are made the excuse of endless tea-parties and meetings of kirk session in the rural parish of Garnock. *The Annals of the Parish* are told by the Rev. Micah Bahlwhidder, Galt's finest character. He died April 11, 1839.

GALOIS, EVARISTE, an eminently original and profound French mathematician, born October 26, 1811; killed in a duel May, 1832.

GALUPPI, BALDASSARRE, a musical composer, was born in 1706, in the island of Burano, near Venice. He died in 1785, and left 50,000 lire to the poor of Venice.

GALVANI, LUIGI, an eminent Italian physiologist, after whom galvanism received its name, was born at Bologna, September 9, 1737. It was his wish in early life to enter the church, but by his parents he was educated for a medical career. At the university of Bologna, in which city he practiced, he was in 1762 appointed public lecturer in anatomy, and soon gained repute as a skilled, though not eloquent teacher, and, chiefly from his researches on the organs of hearing and genito-urinary tract of birds, as a comparative anatomist. His celebrated theory of animal electricity he enunciated in a treatise, *De viribus electricitatis in motu musculari commentarius*, published in the eighth volume of the memoirs of the Institute of Sciences at Bologna in 1791, and separately at Modena in the following year, and elsewhere subsequently. The statement has frequently been repeated that, in 1786, Galvani had skinned some frogs to make broth for his wife, who was in delicate health; that the leg of one of these, on being accidentally touched by a scalpel which had laid near an electrical machine, was thrown into violent convulsions; and that it was thus that his attention was first directed to the relations of animal functions to electricity. From documents in the possession of the Institute of Bologna, however, it appears that twenty years previous to the publication of his *Commentary* Galvani was already engaged in investigations as to the action of electricity upon the muscles of frogs. The observation that the suspension of certain of these animals on an iron railing by copper hooks caused twitching in the muscles of their legs led him to the invention of his metallic arc, the first experiment with which is described in the third part of the *Commentary*, wherein it is registered September 20, 1786. The arc he constructed of two different metals, which, placed in contact the one with a nerve and the other with a muscle of a frog, caused contraction of the latter. On Galvani's refusal to take the oath of allegiance to the Cisalpine republic on its establishment, he was removed from his professorship. Deprived thus of the means of livelihood, he retired to the house of his brother Giacomo, where he soon fell into a feverish decline. The republican government, in consideration of his great scientific fame, eventually, but too late, determined to reinstate him in his chair at the university of Bologna. He died December 4, 1798.

GALVANISM. See ELECTRICITY and PHYSIOLOGY.

GALVANOMETER, an instrument used for indicating or measuring currents of electricity, wherein advantage is taken of the force exerted by such currents on movable magnets in their neighborhood. When a galvanometer is used for indicating merely, without measuring, it is sometimes called a galvanoscope. If we consider only such instruments as have come into actual

use, this definition is strict enough for practical purposes. If we were to consider all the instruments that have been or might be made, some would come under the definition whose resemblance to the modern galvanometer would not at first sight be apparent. Such, for instance, is the electro-magnetic balance of Becquerel, which consists of two bar magnets hung from the scale pans of a delicate balance, each in the axis of a cylindrical bobbin of wire—one being over, the other under its corresponding bobbin. The north poles of both magnets hang downwards, and the current to be measured is sent around the bobbin, so that each of the magnets is repelled. Weights are put into the left-hand scale until equilibrium in the original position is restored. The weight thus added is proportional to the current strength, so long as the induced magnetism of the magnets can be neglected. This instrument has fallen into disuse.

GALVESTON, a city and port of entry on the coast of Texas, United States of North America, situated about 340 miles to the westward of the mouth of the South Pass of the Mississippi River, on the south side of the entrance into Galveston Bay. It is the principal port and the largest city in the State, is the seat of justice of Galveston county, and is located on the inner shore of Galveston island, about two miles from its most northeasterly point, known as Fort Point. Galveston is handsomely laid out, has wide and straight streets, and several public squares, parks, and gardens. The streets running parallel to West Bay are known as avenues, and are designated by the letters of the alphabet, beginning at the bay, while those at right angles to the water are numbered. The city has several educational institutions of high grade, numerous hotels and public buildings and many handsome residence and commercial structures. It has a spacious harbor, and important railway connections. Its railroad facilities are good, and its telegraph connections are extensive. Considerable overland and marine commerce centers here, and the business of the city is steadily increasing. The island on which the city is built was originally a rendezvous for buccaneers, who were finally driven away by the United States navy. The city was founded in 1838 or 1839 by a band of settlers under the leadership of one Menard.

The cotton business of the place is represented by several cotton presses and many immense brick warehouses, furnishing storage-room for nearly 200,000 bales of cotton, and covering an area of more than fifty acres. There are two national banks, with an authorized capital of \$800,000, and a paid-up cash capital of \$300,000,—the aggregate paid-up capital of all the banks being upward of \$2,000,000.

Galveston was taken by the United States forces in 1862, but was recaptured by the Confederates in 1863. In 1885 an extensive fire broke out and destroyed a large amount of property. The city in some portions is so slightly elevated above the level of the sea that at times the wind blowing inshore backs the water over a portion of the town to a depth of several inches. Population (1890), 29,084.

GALWAY, a maritime county in the province of Connaught, in the extreme west of Ireland, is bounded on the north by Mayo and Roscommon; east by Roscommon, King's county, and Tipperary; south by Clare and the Bay of Galway; and west by the Atlantic Ocean. The area comprises 2,447 square miles, or 1,566,080 acres, of which 90,230 are under water. The county is naturally divided by Lough Corrib into two great divisions. The eastern, which comprehends all the county except the four western baronies, rests on a limestone base, and is, generally speaking, a level



**champaign** country, but contains large quantities of wet bog. Its southern portion is partly a continuation of the Golden Vale of Limerick, so celebrated for its fertility, and partly occupied by the Slievebaughy Mountains. The northern portion of the division contains rich pasture and tillage ground, beautifully diversified with hill and dale. Some of the intermediate country is comparatively uncultivated, but forms excellent pasturage for sheep. The western division of the country has a substratum of granite and is barren, rugged and mountainous.

Galway enjoys the advantage of a very extended line of sea-coast, indented by numerous harbors, which, however are rarely used excepting by a few coasting and fishing vessels. Commencing at the coast of Mayo in the north are the Killeries, two bays which separate the counties of Galway and Mayo. The first bay on the western coast capable of accomodating large ships is Ballynakill, sheltered by Freaghillaun or Heath Island. Next in succession is Cleggan Bay, having Innishboffin in its offing. Streamstown is a narrow inlet, within which are the inhabited islands of Omey, Turbot and Inishturk. Ardbear harbor divides itself into two inlets; the northern terminated by the town of Clifden, with excellent anchorage opposite the castle; the southern inlet has also good anchorage within the bar, and has a good salmon fishery.

The rivers are few and, except the Shannon, are of small extent. The Suck, which forms the eastern boundary of the county, rises in Roscommon, and, passing by Ballinasloe, unites with the Shannon at Shannon bridge. The Shannon, which rises at the foot of Cuileagh in the county of Cavan, forms the southeastern boundary of the county, and, passing Shannon Harbor, Banagher, Meelick, and Portumna, swells into the great expanse of water called Lough Derg, which skirts the county as far as the village of Mount Shannon. The Claregalway flows southward through the center of the county, and enters Lough Corrib some four miles above the town of Galway. The Ballynahinch, considered one of the best salmon-fishing rivers in Connaught, rises in the Twelve Pins, passes through Ballynahinch Lake, and, after a short but rapid course, falls into Birturbuy Bay.

The lakes are numerous. Lough Corrib extends from Galway town northward over 30,000 acres, with a coast of fifty miles in extent. It has now been made navigable to Lough Mask (which lies chiefly in Mayo county) and to the sea at Galway. The lake is studded with many islands, some of them thickly inhabited. Near it is Lough Ross, which receives a large supply of water from streams, but has no visible outlet. The district to the west of Lough Corrib contains in all about 130 lakes, twenty-five of them each more than a mile in length. Lough Rea, at the town of the same name, is more remarkable for scenic beauty than for extent. The climate is mild and salubrious but variable, and violent winds from the west are not uncommon. Frost and snow seldom remain long on the western coast, and cattle of every description continue unhoused during the winter. The eastern part of the county produces the best wheat. Oats are frequently sown after potatoes in moorish soils less adapted for wheat. The flat shores of the bays afford large supplies of seaweed for manure. Limestone, gravel and marl are to be had in most other parts. When a sufficient quantity of manure for potatoes can not be had, the usual practice is to pare and burn the surface.

In many places on the sea shore, fine early potatoes are raised in deep sea sand, manured with sea-weed, and the crop is succeeded by barley. Those parts of the eastern districts less fitted for grain are employed in pasture. Sheep-walks occupy a very large tract between Monivea and Galway.

Manufactures are not carried on beyond the demand caused by the domestic consumption of the people. Coarse friezes, flannels and blankets are made and sold largely in Galway and Loughrea. Connemara has been long celebrated for its hand-knit woolen stockings. Coarse linen of a narrow breadth, called bundle linen, is also made for home consumption. A linen-weaving factory has been established at Oughterard. The manufacture of kelp, formerly a great source of profit to the western shores, is still carried on to some extent. Feathers and sea-fowls' eggs are brought in great quantities from the island of Aran, the produce of the puffins and other sea fowl that frequent the cliffs. Fishing affords occupation to many of the inhabitants, but from want of capital is not prosecuted with sufficient vigor. The number of vessels engaged is 451, with 1,104 men and 58 boys.

The county includes one parliamentary borough, Galway; and three townships, Ballinasloe (part of which is however in the county of Roscommon), 4,159; Loughrea, 3,072; and Tuam, 4,223. The largest of the villages are Gort, 1,773; Clifden, 1,313; Athenry, 1,194; Headford, 870; Oughterard, 861; and Eyrecourt, 747. The population in 1831 was 414,684; in 1851, 321,684; and in 1881, 242,005.

**GALWAY**, the county town, and a parliamentary borough, is also a county in itself, with an exclusive jurisdiction extending two miles on every side except the south. It stands on the northern shore of the Bay of Galway, on both sides of the river Corrib, which connects Lough Corrib with the sea.

**GAMA**, **VASCO DA**, the celebrated Portuguese navigator and discoverer, was born at Sines, a small sea-town in the province of Alemtejo. Of Vasco's early history little is known. He was born most likely in 1460. His first service of distinction was in 1497, when he was sent out by King Manoel, of Portugal, to explore the eastern portion of Africa and to find the mythical domains of "Prester John." The fleet, consisting of four vessels specially built for this mission, sailed down the Tagus on July 8, 1497, after prayers and confession made by the officers and crews in the presence of the king and court, in a small chapel on the site where now stands the church of S. Maria de Belem, afterward built to commemorate the event. Four months later it cast anchor in St. Helena Bay, South Africa, rounded the Cape in safety, and in the beginning of the next year reached Melinda. Thence, steering eastward, under the direction of a pilot obtained from Indian merchants met with at this port, Gama arrived at Calicut, on the Malabar coast, on May 20, 1498, and set up, according to the custom of his country, a marble pillar as a mark of conquest and a proof of his discovery of India. His reception by the zamorin, or ruler of Calicut, would have in all probability been favorable enough, had it not been for the jealousy of the Moorish traders who, fearing for their gains, so incited the Hindus against the new comers that Gama, after escaping from enforced detention on shore, was obliged to fight his way out of the harbor. Having seen enough to assure him of the great resources of this new country, he returned home in September, 1499, with a glowing description of it. The king received him with every mark of distinction, created him a noble, and ordered



magnificent fêtes to be held in his honor in the principal towns of the kingdom, "for he had brought back (not without severe loss in ships and in men) the solution of a great problem, which was destined to raise his country to the acme of prosperity." In prosecution of Gama's discoveries another fleet of thirteen ships was immediately sent out to India by Manoel, under Alvarez Cabral, who, in sailing too far westward, by accident discovered Brazil, and on reaching his destination established a factory at Calicut. The natives, again instigated by the Moorish merchants, rose up in arms, and murdered all whom Cabral had left behind. To avenge this outrage a powerful armament of ten ships was fitted out at Lisbon, the command of which was at first given to Cabral, but was afterward transferred to Gama on his urgent petition; for, "Sire," he said, "the king of Calicut arrested me and treated me with contumely, and because I did not return to avenge myself of that injury he has again committed a greater one, on which account I feel in my heart a great desire and inclination to go and make great havoc of him." In the beginning of 1502 the fleet sailed, and on reaching Calicut Gama immediately bombarded the town, enacting deeds of inhumanity and savagery too horrible to detail, and equaled only by the tortures of the Inquisition. Gama was naturally "very disdainful, ready to anger, and very rash;" but no peculiarities of disposition—nothing whatever—can excuse such acts as his, which have justly left a stain on his character that neither time nor brightness of his fame as a navigator can in the slightest degree obliterate. From Calicut he proceeded in November to Cochin, "doing all the harm he could on the way to all that he found at sea," and, having made favorable trading terms with it and other towns on the coast, he returned to Lisbon in September, 1503, with richly laden ships. He and his captains were welcomed with great rejoicings; "but to Dom Vasco the king gave great favors, and all his goods free and exempt; he granted him the anchorage dues of India, made him admiral of its seas forever, and one of the principal men of his kingdom." Soon after his return Vasco retired to his residence in Evora, and for twenty years took no part in public affairs, either from pique at not obtaining, as is supposed by some, so high rewards as he expected, or because he had in some way offended Manoel. During this time the Portuguese conquests increased in the East, and were presided over by successive viceroys. The fifth of these was so unfortunate that Gama was recalled from his seclusion by Manoel's successor, João III., created count of Vidigueira, and nominated viceroy of India, an honor which in April, 1524, he left Lisbon to fill. Arriving at Goa in September of the same year, he immediately set himself to correct, with vigor and firmness, the many abuses and evil practices which had crept in under the rule of his predecessors. He was not destined, however, to prosecute far the reforms he had inaugurated, for on Christmas eve following his arrival he died, while at Cochin, after a short illness, and was buried in the Franciscan monastery there. In 1538 his body was conveyed to Portugal and entombed in the town of Vidigueira, of which he was count, with all the pomp and honor due to one who had been the king's representative.

The important discoveries of Vasco da Gama had the immediate result of enriching Portugal, and raising her to one of the foremost places among the nations of Europe, and by degrees the far greater one of hastening colonization and civilization of the East by opening its commerce to the great Western powers.

GAMALIEL, God is a rewarder, a Hebrew proper name, which occurs more than once in the Old Testa-

ment, is repeatedly met with in the history of later Judaism. Of the persons designated by it the most important are enumerated below:

1. GAMALIEL, or Rabban Gamliel the elder, as he is invariably called in the Talmud to distinguish him from his grandson, Rabban Gamaliel or Gamliel of Jabneh (Jamnia), was the son of Rabbi Simeon, and the grandson of Rabbi Hillel. Of his biography little is known beyond the facts that, early in the first century, he lived and taught in Jerusalem, where Saul of Tarsus was for some time his pupil; and that he was a member of the Sanhedrim, which body he successfully counseled to moderation in their treatment of the followers of Jesus. He appears to have died before the destruction of the city. The Talmudists speak of him as having enjoyed the confidence of Cypros, the wife of Agrippa, and having been president of the Sanhedrim during the reigns of Tiberius, Caligula, and Claudius; but the latter representation at least is certainly unhistorical, as may be learned from the New Testament and from Josephus, where it is invariably the high priest who presides over the council.

2. GAMALIEL of Jabneh ranks with his grandfather, Gamaliel the elder, as one of the seven great rabbans of the Talmudists. His father also was named Simeon. On the death of Rabbi Johanan ben Zacai, Gamliel was chosen to succeed him as head of the famous school which had transferred itself to Jamnia or Jabneh shortly before the destruction of Jerusalem. He died about 115 A.D.

3. A third GAMALIEL, son of Jehudah-ha-Nasi, is mentioned in *Aboth*, as having specially insisted on the necessity of combining with the study of the law some active employment in order to the maintenance of a healthy moral tone.

GAMBIA, GAMBRA, BA DIMMA, or FURA, an important river of Western Africa, which enters the Atlantic about 13° 50' N. latitude. Its sources are in the central plateau of the Futa Jallon highlands, a tract of country about 240 miles inland, which also contains the head waters of the Senegal, the Faleme, the Rio Grande, and some tributaries of the Niger. Flowing almost due north for the first 200 miles of its course, it turns somewhat abruptly to the west and continues in that direction through a country of great fertility. Steamers can proceed up the river as far as Yaba Tenda; the channel remains navigable for boats 300 miles from the mouth to the falls of Barraconda; and above the falls it is again navigable, as was shown by Governor Macdonnell's expedition in 1851, for at least 160 miles farther. The principal affluent is the Neries, which, coming from the north, joins the main stream about thirty or thirty-five miles above the falls. At Fattatenda, a short distance below the falls, the river has a breadth, even in the dry season, of about 320 feet, with a depth of from thirteen to twenty feet. In the rainy season it rises from twenty to fifty feet, and the whole country downward to the sea is laid under water, and receives a rich alluvial deposit.

GAMBIER, GAMBIR, or PALE CATECHU. See CATECHU.

GAMBIER, JAMES, BARON, English admiral, was born on October 13, 1756, at the Bahamas, of which his father, John Gambier, was at that time lieutenant-governor. He entered the navy in 1767 as a midshipman. In 1795 he was advanced to the rank of rear-admiral, and appointed one of the lords of the Admiralty. In November, 1805, he was raised to the rank of admiral; and in the summer of 1807, while still a lord of the Admiralty, he was appointed to the command of the fleet ordered to the Baltic, which, in concert with the army under Lord Cathcart, reduced



Copenhagen, and enforced the surrender of the Danish navy, consisting of nineteen ships of the line, besides frigates, sloops, gunboats, and naval stores.

In the spring of the following year he gave up his seat at the Admiralty on being appointed to the command of the Channel Fleet; and in that capacity he witnessed the partial, and prevented the total, destruction of the French fleet in Basque Roads, on April 12, 1809. In 1830 he was raised to the high rank of admiral of the fleet, and he died April 19, 1833.

GAMBOGE, the drug *Cambogia*, a gum-resin procured from *Garcinia Morella*, a member of the natural order *Guttifera*, and indigenous to Camboja (see CAMBODIA), and parts of Siam and of the south of Cochin China, formerly comprised in Cambojan territory. The juice, which when hardened constitutes gamboge, is contained in the bark of the tree, chiefly in numerous ducts in its middle layer, and from this it is procured by making incisions, bamboo joints being placed to receive it as it exudes.

GAME. Certain species of birds and animals, which inhabit various portions of the world, are, by common custom, designated as game. This designation does not include all *feræ naturæ*, but only those which are good for food, or else, by their presence, are dangerous to man or to domestic animals, and their pursuit and capture are indulged in by some persons as a vocation, or as a means of obtaining food, and by others for purposes of recreation. Most States and Territories have laws which prohibit the killing of game, except during a brief period in summer or autumn. Several States prohibit the exportation of game; one (Missouri) has a law which makes it a misdemeanor for any non-resident to hunt within her boundaries, and one (New Jersey) requires non-residents to pay a license fee in order to shoot within her limits. Among large mammals, designated as game, may be mentioned the buffalo (now nearly extinct in its wild state), the moose, elk, caribou, deer, antelope, Rocky mountain sheep and goat, the bear, cougar, and wolf. The moose is found in northern Maine, northwestern Minnesota, and in portions of Montana, Idaho, Washington, and British America. The elk is found in northeastern Minnesota, Montana, Idaho, Washington, Oregon, Colorado, New Mexico, Arizona, and the Canadian Northwestern Provinces. The range of the caribou extends through northern Maine, eastern Canada, northeastern Minnesota, British Columbia, and northern Washington; while some one of the various species of deer may be found in nearly every State or Territory of the Union, and throughout British America. The black bear is also widely distributed throughout the Union, while the habitat of the grizzly is confined to the regions west of the Missouri river, and that of the polar bear to the Arctic regions. The antelope is found on the great plains of the far West, and the Rocky mountain sheep and goat are, as their names indicate, natives of the mountainous regions west of the Missouri river. The cougar, wolf and several other mammals of the non-edible class are widely distributed and are hunted for sport or for peltry. Of American water-fowls the best known are the several species of wild geese, brants and ducks. These are all migratory, breeding in the far North and Northwest, and going south to spend the winters. In their semi-annual migrations they stop to rest and feed at various lakes, or on the uplands, of which habit sportsmen and market hunters take advantage. Canvas-back and red-head ducks are perhaps prized more highly than any others, and their favorite resorts, en route, are certain lakes in Wisconsin and Illinois. They winter principally on the seacoast of Maryland, Virginia, and the Carolinas, where thousands of them are annually

killed. Of upland game-birds those most prized are the wild turkey, several species of grouse, snipe, and plovers, and the quail, all of which are widely distributed. Owing to the rapid growth of population in the United States, and the consequent increase in the number of sportsmen and market hunters, game of all kinds is being rapidly exterminated, and only by the enactment and strict enforcement of protective game laws can it be saved from total extinction. In many of the States such laws have been passed, and where properly executed the result has been of a gratifying character.

GAME LAWS are legislative enactments for the prevention of indiscriminate slaughter (particularly during the breeding seasons) and consequent extinction of wild or game animals, such as are not in themselves noxious and dangerous as beasts of prey; and are also designed to prevent the encroachment or poaching by one party upon the preserves or land of another. Nearly every State in the Union has its code of game laws, declaring the open and close seasons, and defining what animals or birds are or are not game.

GAMES. The public games of Greece and Rome were athletic contests and spectacles of various kinds, generally connected with and forming part of a religious observance. Probably no institution exercised a greater influence in molding the national character, and producing that unique type of physical and intellectual beauty which we see reflected in Greek art and literature, than the public contests of Greece. For them each youth was trained in the gymnasium, they were the central mart whither poet, artist, and merchant each brought his wares, and the common ground of union for every member of the Hellenic race. It is to Greece then that we must look for the earliest form and the fullest development of ancient games, and we propose in the present article to treat principally of the Greek ἀγῶνες. The shows of the Roman circus and amphitheater were at best a shadow, and in the later days of the empire a travesty, of the Olympia and Pythia, and require only a cursory notice. "Corruptio optimi fit pessima." From the noblest spectacle in the world, the Greek Olympia, the downward course of public games can be traced, till we reach the ignoblest, the Roman amphitheater, of whose horrors we may still form a faint picture from its last survival, the Spanish bull-fight.

The earliest games of which we have any record are those at the funeral of Patroclus, which form the subject of the twenty-third Iliad. The Olympian games were the earliest, and to the last they remained the most celebrated of the four national festivals. Olympia was a naturally inclosed spot in the rich plain of Elis, bounded on the north by the rocky heights of Kronos, and on the south and west by the Alpheus and its tributary the Kladeus. In 776 B.C. the Eleians engraved the name of their countryman Corœbus as victor in the foot-race, and thenceforward we have an almost unbroken list of the victors in each succeeding Olympiad or fourth recurrent year. For the next fifty years no names occur but those of Eleians or their next neighbors. After 720 B.C. we find Corinthians and Megareans, and later still Athenians and extra-Peloponnesians. Thus what at first was nothing more than a village bout became a bond of union for all branches of the Doric race, and grew in time to be the high feast to which every Greek gathered, from the mountain fastnesses of Thessaly to the remotest colonies of Cyrene and Marseilles. It survived even the extinction of Greek liberty, and had nearly completed twelve centuries when it was abolished by the decree of the Christian emperor Theodosius, in the tenth year of his reign. The last Olympian victor was a Romanized Armenian named Varastad.



At these quadrennial gatherings people assemble from every part of Greece. Along the "holy road" from the town of Elis there is crowding a motley throng. Conspicuous in the long train of pleasure-seekers are the sacred deputies, clad in their robes of office, and bearing with them in their carriages of state offerings to the shrine of the god. Nor is there any lack of distinguished visitors. It may be Alcibiades, who, they say, has entered no less than seven chariots; or the sophist Hippias, who boasts that all he bears about him, from the sandals on his feet to the dithyrambs he carries in his hand, are his own manufacture; or Aetion, who will exhibit his picture of the *Marriage of Alexander and Roxana*—the picture which gained him no less a prize than the daughter of the Hellanodices Praxionides; or, in an earlier age, the poet-laureate of the Olympians, Pindar himself. Lastly, as at the mediæval tournament, there are "store of ladies whose bright eyes rain influence"; matrons, indeed, are excluded on pain of death, but maidens, in accordance with Spartan manners, are admitted to the show.

At daybreak the athletes presented themselves in the Bouleuterion, where the presidents were sitting, and proved by witnesses that they were of pure Hellenic descent, and had no stain, religious or civil, on their character. Laying their hands on the bleeding victim, they swore that they had duly qualified themselves by ten months' continuous training in the gymnasium, and that they would use no fraud or guile in the sacred contests. Thence they proceeded to the stadium, where they stripped to the skin and anointed themselves. A herald proclaimed: "Let the runners put their feet to the line," and called on the spectators to challenge any disqualified by blood or character. If no objection was made, they were started by the note of the trumpet, running in heats of four, ranged in the places assigned them by lot. The presidents seated near the goal adjudged the victory. The foot race was only one of twenty-four Olympian contests which Pausanias enumerates, though we must not suppose that these were all exhibited at any one festival. Till the seventy-seventh Olympiad all was concluded in one day, but afterward the feast was extended to five. The order of the games is for the most part a matter of conjecture, but, roughly speaking, the historical order of their institution was followed.

The *Pythian* games, second only to the Olympian in importance, were founded after the first Sacred War out of the spoils of Cirrha, 595 B.C. The prizes were a wreath of laurel and a palm.

The *Nemean* games, originally a warlike gathering and review, were held in honor of Nemean Zeus at the grove of Nemea, between Cleonæ and Phlius, in the second and fourth year of each Olympiad. They date from about 570 B.C. The prize was a chaplet of parsley.

The *Isthmian* games, founded a little earlier than the Nemean, partook at first of the nature of mysteries. They were held on the narrowest part of the Isthmus of Corinth in honor of Poseidon in the first and third year of each Olympiad. Their prize was a wreath of pine leaves. The importance of the Isthmian games in later times is shown by the fact that Flamininus chose the occasion for proclaiming the liberation of Greece, 196 B.C.

The *Ludi Publici* of the Romans included feasts and theatrical exhibitions as well as the public games with which alone we are concerned. As in Greece, they were intimately connected with religion. At the beginning of each civil year it was the duty of the consuls to vow to the gods games for the safety of the commonwealth, and the expenses were defrayed by the treasury. Thus, at no cost to themselves, the Roman public were enabled to indulge at the same time their religious feel-

ings and their love of amusement. Their taste for games naturally grew till it became a passion, and under the empire games were looked upon by the mob as one of the two necessities of life. The ædiles who succeeded to this duty of the consuls were expected to supplement the state allowance from their private purse. Political adventurers were not slow to discover so ready a road to popularity, and what at first had been exclusively a state charge devolved upon men of wealth and ambition. A victory over some barbarian horde or the death of a relation served as the pretext for a magnificent display. But the worst extravagance of private citizens was eclipsed by the reckless prodigality of the Cæsars, who squandered the revenues of whole provinces in catering for the mob of idle sight-seers on whose favor their throne depended. But though public games played as important a part in Roman as in Greek history, and must be studied by the Roman historian as an integral factor in social and political life, yet, regarded solely as exhibitions, they are comparatively devoid of interest, and we sympathize with Pliny, who asks his friend how any man of sense can go day after day to view the same dreary round of fights and races.

It is easy to explain the different feelings which the games of Greece and of Rome excite. The Greeks at their best were actors, the Romans from first to last were spectators. It is true that even in Greek games the professional element played a large and ever-increasing part. As early as the sixth century B.C., Xenophanes complains that the wrestler's strength is preferred to the wisdom of the philosopher, and Euripides, in a well-known fragment, holds up to scorn the brawny, swaggering athlete. But what in Greece was a perversion, and acknowledged to be such, the Romans not only practiced, but held up as their ideal. No Greek, however high in birth, was ashamed to compete in person for the Olympic crown. The Roman, though little inferior in gymnastic exercises, kept strictly to the privacy of the palæstra; and for a patrician to appear in public as a charioteer, is stigmatized by the satirist as a mark of shameless effrontery.

Roman games are generally classified as *fixed*, *extraordinary*, and *votive*.

For the Roman world, the circus was at once a political club, a fashionable lounge, a rendezvous of gallantry, a betting ring, and a playground for the million. Juvenal, speaking loosely, says that in his day it held the whole of Rome; and there is no reason to doubt the precise statement of P. Victor, that in the circus Maximus there were seats for 350,000 spectators.

GAMES, GAMING. Looking at these in their legal aspects, it will be seen that from very early times the law has attempted to exercise some control over the sports and pastimes of the people—particularly those involving an element of gambling. Certain games were either prohibited altogether, or reserved for people of some position in society. The efforts of modern legislation have been confined to the suppression of those games which are either dangerous to life or limb, or else contain within themselves the elements of gambling. In nearly all civilized countries this is the status of affairs, the law not interfering except to preserve the health, safety or morals of its subjects. In the different countries, notably in Russia, there may occasionally arise exigencies which seem to demand the suppression of certain games as having a political effect, but such occasions are rare.

GANDERSHEIM (in Eberhard's Chronicle, Gandersem), a town of Germany at the head of a circle in the duchy of Brunswick, situated on the Gande, a tributary of the Weser, about forty-eight miles south-west of Brunswick. Population, 3,000.



**GANDIA**, an ancient wall-encircled city of Spain, in the province and archbishopric of Valencia, is beautifully situated in the fertile huerta or garden of Gandia, about three miles from the mouth of the river Alcoy.

**GANDO**, a kingdom of northwestern Africa in the Sudan, comprising that part of the territory watered by the Quorra or Niger which extends from the Birni and Say in the north to Idda in the south.

**GANGANELLI**. See CLEMENT XIV.

**GANGES**, a river of northern India, formed by the drainage of the southern ranges of the Himálayas. This mighty stream, which in its lower course supplies the great river system of Bengal, rises in the Garhwál state, and falls into the Bay of Bengal after a course of 1,500 miles. It issues, under the name of the Bhágirathí, from an ice cave at the foot of an Himálayan snow bed near Gangotri, 10,300 feet above the level of the sea. During its earlier passage through the southern spurs of the Himálayas, it receives the Jahnvi from the northwest, and subsequently the Alaknanda, after which the united stream takes the name of the Ganges. Deo Prayág, their point of junction, is a celebrated place of pilgrimage, as is also Gangotri, the source of the parent stream. At Sukhi it pierces through the Himálayas, and turns southwest to Hardwár, also a place of great sanctity. It proceeds by a tortuous course through the districts of Dehra Dún, Saháranpur, Muzaffarnager, Bulandshahr, and Farrukhabad, in which last district it receives the Rámangá. Thus far the Ganges has been little more than a series of broad shoals, long deep pools, and rapids, except, of course, during the melting of the snows and throughout the rainy season. At Allahábád, however, it receives the Jumna, a mighty sister stream, which takes its rise also in the Himálayas to the west of the sources of the Ganges. The combined river winds eastward by southeast through the Northwestern Provinces, receiving the Gumti and the Gográ. The point of junction of each of these streams has more or less pretension to sanctity. But the tongue of the land at Allahábád, where the Jumna and the Ganges join, is the true Prayág, the place of pilgrimage, to which hundreds of thousands of devout Hindus repair to wash away their sins in the sacred river. Shortly after passing the holy city of Benares, the Ganges enters Behar, and after receiving an important tributary, the Son, from the south, passes Patná, and obtains another accession to its volume from the Gandak, which rises in Nepál. Further to the east, it receives the Kusií, and then, skirting the Rájmahál hills, turns sharply to the southward, passing near the site of the ruined city of Gaur. By this time it has approached to within 240 miles, as the crow flies, from the sea. About twenty miles further on, it begins to branch out on the level country, and this spot marks the commencement of the delta, 220 miles in a straight line, or 300 by the windings of the river, from the Bay of Bengal. The main channel takes the name of the Padma or Padda, and proceeds in a southeasterly direction, past Pábná to Goalandá, above which it is joined by the Jamuná or main stream of the Brahmaputra. The vast confluence of waters rushes toward the sea, receiving further additions from the hill country on the east, and forming a broad estuary known under the name of Meghná, which enters the Bay of Bengal near Noákháli. This estuary, however, is only the largest and most easterly of a great number of mouths or channels. The most westerly is the Húglí or Hooghly which receives the waters of a number of distributary channels that start from the parent Ganges in the neighborhood of Murshidábád. Between the Húglí on the west and the Meghná on the east lies the delta.

**GANGI**, a town of Italy, in the province of Palermo, and circondario of Cefalu, about twenty-three miles inland from the town of Cefalu. Population, 13,300.

**GANGOTRI**, a celebrated place of Hindu pilgrimage, situated among the Himálaya mountains, in the state of Gárhwal, on the Ganges, which is here not above fifteen or twenty yards broad, with a moderate current, and not in general above three feet deep.

**GANGPUR**, a tributary state of Chutiá Nágpur, Bengal. Population (1890), 76,000.

**GANGRENE**. See MORTIFICATION.

**GANILH, CHARLES**, a distinguished political economist, was born at Allanche in Cantal, on January 6, 1758. He died in 1836. Ganilh is best known as the most vigorous defender of the mercantile school in opposition to the views of Adam Smith and the English economists.

**GANJAM**, a district of Madras. The district is exceedingly mountainous and rocky, but is interspersed with open valleys and fertile plains. Pleasant groves of trees in the plains give to the scenery a greener and less Indian appearance than is usually met with in the districts to the south. Population, 1,600,000.

Ganjam formed part of the ancient kingdom of Kalinga. Its early history is involved in obscurity, and it was not until after the Gajapati dynasty ascended the throne of Orissa, that this tract became even nominally a part of their dominions.

**GANNAL, JEAN NICOLAS**, a distinguished French technical chemist, was born at Sarre-Louis, July 23, 1791. He was the first to introduce into printing the use of elastic rollers, which he formed by a mixture of gelatine and sugar, and his process for the melting of tallow, and hardening it with acids, prepared the way for the manufacture of wax-candles. In 1823 he took out a patent for the making of glue and gelatine. He obtained one of the Monthyon prizes of the Institute in 1827 for the employment of chlorine in the treatment of catarrh and phthisis, and again, in 1835, for his discovery of the efficacy of the injections of solutions of acetate and chloride of aluminium in preserving anatomical preparations. Turning his attention next to embalming, he showed that it could be accomplished without mutilation of the body, and with greater economy than after the old methods, by injecting into one of the carotid arteries solutions of aluminium salts. Gannal died at Paris in 1852.

**GANNAT**, a town of France, capital of an arrondissement in the department of Allier, is situated on the Anelot, an affluent of the Allier, thirty-three miles south-by-west of Moulins. Population, 6,000.

**GANNET** (Anglo-Saxon, *ganot*), or SOLAN GOOSE, the *Pelecanus bassanus* of Linnæus, and the *Sula bassana* of modern ornithologists, a large sea-fowl, long known as a numerous visitor, for the purpose of breeding, to the Bass Rock, at the entrance of the Firth of Forth, and to certain other islands off the coast of Britain, of which four are in Scottish waters—namely, Ailsa Craig, at the mouth of the Firth of Clyde; the group known collectively as St. Kilda; Suleskerry, some forty miles northeast of the Butt of Lewis; and the Stack and Skerry, about the same distance westward of Stromness. On the western side of the Atlantic it appears to have but five stations, one in the Bay of Fundy, and four rocks in the Gulf of St. Lawrence. On all these seventeen places the bird arrives about the end of March or in April, and departs in autumn, when its young are ready to fly; but even during the breeding-season many of the adults may be seen on their fishing excursions at a vast distance from their home, while at other times of the year their range is greater still, for they not only frequent the North Sea and the English Channel, but



stray to the Baltic, and, in winter, extend their flight to the Madeiras, while the members of the species of American birth traverse the ocean from the shores of Greenland to the Gulf of Mexico.

Apparently as bulky as a goose, and with longer wings and tail, the gannet weighs considerably less. The plumage of the adult is white, tinged on the head and neck with buff, while the outer edge and principal quills of the wing are black, and some bare spaces round the eyes and on the throat reveal a dark blue skin. The first plumage of the young is of a deep brown above, but paler beneath, and each feather is tipped with a triangular white spot. The nest is a shallow depression, either on the ground itself or on a pile of turf, grass, and seaweed—which last is often conveyed from a great distance.

GANS, EDWARD, a distinguished jurist, was born at Berlin, on March 22, 1798. He attended Hegel's lectures at Berlin and became thoroughly imbued with the principles of the Hegelian philosophy. In 1825 he traveled for some months in England and France, and on his return was named professor extraordinarius at Berlin. At this period the historical school of jurisprudence was coming to the front, and Gans, already, from his Hegelian tendencies, predisposed to treat law historically, applied the method to one special branch of legal relations—the right of succession. He died in 1839. Gans edited the *Philosophie der Geschichte* in Hegel's *Werke*, and contributed an admirable preface.

GÄNSBACHER, JOHANN BAPTIST, a musical composer of repute, was born in 1778 at Sterzing in Tyrol. He creditably filled the responsible and difficult post of director of the music at St. Stephen's Cathedral, Vienna, from 1823 till his death (July 13, 1844); and his compositions betray the musician of high gift and accomplishment. They consist chiefly of church music, not less than seventeen masses, besides litanies, motets, offertories, etc., being among the number. He also wrote several sonatas, a symphony, and one or two minor compositions of a dramatic kind.

GANYMEDE affords a typical example of the manner in which myth-making continued as a living process through the whole of Greek history. In the thought of the primitive Indo-Germanic race occupied with the simplest cares of living, a very frequent subject was naturally the rain; and their thought has been preserved to us in the form of mythology. As the rain descends to earth it is the chief blessing to men, while in the clouds it gladdens the dwellers there. Hence arises the idea of a drink for the gods—the soma of the Hindus, the meth of the Norsemen, and the nectar of the Greeks—which plays such an important part in the *Rig Veda*, the *Edda*, and the Homeric poetry. The guardian and giver of the divine drink occurs in many forms, sometimes as a bird, sometimes as a divine being. Just as the eagle brings nectar to Zeus in Crete, so Odin takes the form of an eagle to steal the meth from Guttung for the use of the gods. The same divinity that in heaven distributes the drink to the gods is on earth the genius that presides over the due supply of water. Hence among the Greeks Ganymede, as the genius is called, exists in heaven as the Aquarius of the zodiac, while on earth he is, as Pindar tells, the genius of the fountains of the Nile, which was *par excellence* the life-giving and fertilizing river of the earth.

But the form under which the Ganymede myth most commonly appears has its origin in Asia Minor and in Crete. Homer says that Ganymede was a son of Tros, and that the gods on account of his beauty carried him off to heaven to dwell among the immortals and pour out the wine for Zeus. The *Little Iliad* again makes him the son of Laomedon, and says that Zeus gave his

father a golden vine in exchange for him. In the Trojan Ganymede there is not much trace left of the old kindly genius who distributes the blessings out of the clouds. We may indeed, when we remember that the Greeks admired personal beauty as almost divine, be able to see in this translation the good genius returning alive to heaven after his sojourn on earth, an idea that occurs in the mythology of almost every race. But now he seems rather to represent the everlasting youth and beauty that attend on the gods, and to be the male counterpart of Hebe, who was worshiped in Philus under the name Ganymede.

GAP (the ancient *Vapincum*), a town of France, capital of an arrondissement and also of the department of Hautes Alpes, is situated on the right bank of the Luye, forty-six miles southeast of Grenoble.

GARAT, DOMINIQUE JOSEPH, was born at Bayonne September 8, 1749. After receiving a good education under the direction of a relation who was a curé, he came to Paris, where he obtained introductions to the most distinguished writers of the time, and became a contributor to the *Encyclopédie Méthodique* and the *Mercur de France*. He gained considerable reputation by an éloge on L'Hôpital in 1778, and was afterward three times crowned by the Academy for éloges on Suger, Montausier, and Fontenelle. In 1785 he was named professor of history at the Athenæum, where his lectures enjoyed an equal popularity with those of Laharpe on literature. Being chosen a deputy to the states-general in 1789, he rendered important service to the popular cause by his narrative of the proceedings of the assembly contributed to the *Journal de Paris*. Possessing strongly optimistic views, a mild and irresolute character, and indefinite and changeable convictions, he played a somewhat undignified part in the great political events of the time, and became a pliant tool in carrying out the designs of others. He succeeded Danton as minister of justice in 1792, and in this capacity had intrusted to him what he called the *commission affreuse* of communicating to Louis XVI. his sentence of death. In 1793 he became minister of the interior, and during the Reign of Terror he was imprisoned, but he received his liberty after the revolution of the 9th Thermidor, and was named minister of public instruction. In 1798 he was appointed ambassador to Naples, and in the following year he became a member of the Council of the Ancients. After the revolution of the 18th Brumaire, he was chosen a senator by Napoleon and created a count. During the Hundred Days he was a member of the chamber of representatives, and strongly opposed the recall of the Bourbons. In 1803 he was chosen a member of the Institute of France, but after the restoration of Louis XVIII. his name was, in 1816, deleted from the list of members. After the revolution of 1830 he was named a member of the new Academy of Moral and Political Science. He died at Ustaritz near Bayonne, April 25, 1853.

GARAT, PIERRE-JEAN, one of the most famous singers of his time, nephew of the former, was born at Ustaritz, April 25, 1764. Gifted with a voice of exceptional timbre and compass, he devoted himself, from an early age, to the cultivation of his musical talents. After the revolution he became a professional singer, and on account of a song which he had composed in reference to the misfortunes of the royal family he was thrown into prison. On regaining his liberty he went to Hamburg, where he at once achieved extraordinary success; and by his subsequent appearances in Paris, and his visits to Italy, Spain, Germany, and Russia, he made for himself a reputation as a singer unequalled by any other of his own time. He was a keen partisan of the composer Gluck in opposition to Handel. On the



institution of the Conservatoire de Musique, he became its professor of singing. He is also the composer of a number of songs, many of which have considerable merit. He died March 1, 1823.

GARAY, JÁNOS, Hungarian poet and author, was born October 10, 1812, at Szegzárd, in the county of Tolna. From 1823 to 1828 he studied at Fünfkirchen, and subsequently, in 1829, at the university of Pesth. Here, having become acquainted with the works of the best German authors, he devoted himself to literary pursuits, and in 1834 brought out an heroic poem, in hexameters, under the title *Csatár*. After this he issued in quick succession various historical dramas, among which the most successful were *Arbócz*, *Ország-hlona*, and *Báthori Erzsébet*. In 1848 Garay was nominated professor of Hungarian language and literature to the university of Pesth, but in the following year he resigned that post. In 1850 he became enfeebled in health, and at length unfit for further literary efforts. After about four years' illness, he died on November 5, 1853, in great want, in the forty-second year of his age. A collective edition of his poems was published at Pesth the year after his death.

GARBO, RAFFAELLINO DEL, a Florentine painter, was born in 1466; died in 1524. His real name was Raffaello Capponi; Del Garbo was a nickname, bestowed upon him seemingly from the graceful nicety (*garbo*) of his earlier works. He was a scholar of Filippino Lippi, with whom he remained till 1490, if not later. He showed great facility in design, and excited hopes which the completed body of his works fell short of. Three of his best tempera pictures are in the Berlin Gallery; one of the Madonna standing with her Infant between two musician-angels, is particularly attractive.

GARCAO, PEDRO ANTONIO CORREA, Portuguese lyric and dramatic poet, was born in the neighborhood of Lisbon on April 24, 1724. Almost nothing of his biography is known except that he lived a life of quiet domesticity and learned leisure, in a rural retreat at Fonte-Santa near the capital, till about his forty-sixth year, when he was imprisoned on an obscure charge believed to have arisen out of some expressions in his writings that had given offense to a despotic government. After languishing in confinement for eighteen months, he was released by death on November 10, 1772. His works, which include sonnets, odes, satires, and epistles, as well as dramatic pieces, were published for the first time in a collected form in 1778.

GARCIA, MANOEL, or, in full, Manoel Garcia del Popolo Vicente, was born in 1775 at Seville. He began artistic life as chorister at the cathedral of Seville, and simultaneously studied music under the best masters of his native city. At the age of seventeen he made his début on the stage at Cadiz, in an operetta of his own composition. Soon afterward he appeared at Madrid in his twofold capacity of singer and composer. His reputation being thus established, he proceeded to Paris, where he appeared for the first time, in 1808, in Paer's opera *Griselda*. Here also he was received with great applause, his style of singing being especially appreciated. This he further improved by careful study of the Italian method in Italy itself, where he continued his successes. His opera, *The Caliph of Bagdad*, was favorably received at Naples in 1812, but his chief successes were again due to his perfection as a vocalist. In 1824 he went to London, and thence proceeded to America (1825) with a company of excellent artists, among whom were his son Manoel and his daughter Maria, better known under her subsequent name of Malibran. He extended his artistic tour as far as Mexico, and was on the point of returning to Europe in order to retire from public life, when he was

robbed of his well-earned wealth by brigands on his way to Vera Cruz. Settled again in Paris, he soon retired from the stage, and devoted himself exclusively to teaching. He died in 1832.

GARCILASO DE LA VEGA, soldier and poet, was born at Toledo in 1503. At the age of seventeen he received a military appointment as a "contino" or guardsman to Charles V., and in that capacity took part in the war against the insurgent comuneros, having been present at the battle of Olias near Toledo, where he received a wound in the face. Being with Charles in the neighborhood of Fréjus during the retreat from Marseilles, Garcilaso de la Vega was ordered to silence a small fort at the village of Muy, which had been harassing the movements of the army. In the successful discharge of this duty he received a wound on the head which, twenty-one days afterward, at Nice, proved fatal (October 14, 1536).

GARCILASO INCA DE LA VEGA, historian of ancient Peru, was born at Cuzco in 1540. His father was a cadet of the illustrious family of La Vega, who had gone to Peru in the suite of Pedro de Alvaredo, soon after the conquests of Pizarro; his mother was of the Peruvian blood-royal, a circumstance of which he was not a little proud, as giving a right to the title which he claimed by invariably subscribing himself "Inca." In 1560 he removed to Spain, and, having entered the military service, was engaged in the wars against the Moors and Turks. Disappointed in the inadequate recognition of his services by the crown, he retired while still a young man into private life at Cordova, where he gave himself to literature, and produced the learned historical work by which he is now known, the *Comentarios Reales que tratan del Origen de los Yncas, reyes que fueron del Peru, de su Idolatria, Leyes, etc.; con la Historia general de Peru*. The first part was published in 1609, and the second within a few months of his death, which occurred in 1616.

GARD, a department in the south of France, consisting of part of the old province of Languedoc, is bounded north by the departments of Lozère and Ardèche, east by the Rhone, which separates it from Vaucluse and Bouches-du-Rhône, south by Hérault and the Mediterranean and west by Aveyron. Pop., 420,000.

GARDA, LAKE OF, the Italian LAGO DI GARDA and ancient *Benacus*, the largest and most eastern of the great lakes of northern Italy. It is inclosed by Alpine ridges on both sides, except toward the south, where it widens out into the Lombard plain. The northern extremity belongs to the Austrian district of Tyrol, while the remainder is divided between the two old Italian provinces of Venetia and Lombardy. The length of the lake is about thirty-eight miles; its width varies from two or three miles in the north to eleven or twelve in the south; and its area is estimated at one hundred and thirty-five square miles. The ordinary elevation of the surface above the level of the sea is three hundred and twenty feet, but this is increased by three or five feet by the melting of the Alpine snows at the beginning of summer. The greatest depths are about nine hundred or one thousand feet. At the northern extremity it receives the waters of the Sarca, a comparatively small Tyrolese stream, and at the southeastern corner, at Peschiera, its surplus is conveyed by the Mincio to the Po. Navigation on the one hand is frequently rendered dangerous by sudden bursts of storm, while on the other hand it is facilitated by the two regular winds called the Ora or Andar and the Sover, of which the former blows from the south from midday to midnight, and the latter from the north from midnight to midday.

GARDAIA, or GHARDAVA (in the local documents



Taghardeit), a town of North Africa in the Algerian Sahara, situated on a hill in the middle of the Wadi Mezab, on the route between Morocco and Tripoli, about thirty-six miles west-northwest of Wargla, at a height of 1,755 feet above the sea-level.

GARDELEGEN (formerly GARDELEBEN and GARDLEBEN), the chief town of a circle in the government district of Magdeburg, Prussian Saxony, is situated on the right bank of the Milde, twenty-eight miles north-northwest of Magdeburg. Population, 6,600.

GARDE NATIONALE, the burgher defenders of order in Paris and certain other French towns, was first introduced into Paris during the Revolution of 1789, having been at first employed to defend the rights and privileges of the city, and subsequently to guard the persons and property of the citizens. It acted a conspicuous part in the Revolution, its sympathies and support being given to first one party and then another. In 1794 it was among the most devoted adherents of Robespierre and his bloody triumvirate, ever ready to lend its aid in the execution of their merciless decrees. Later in the year, when the Reign of Terror stood balanced between power and death, the National Guard proved, under the command of Barras, faithful to the Convention, which had deposed Robespierre and his colleagues. In 1795 the National Guard aided in the disarmament of the populace. Not many months after the corps became Royalist in its feelings, carrying its sympathies at length to open rebellion against the Convention; but it sustained an utter defeat from a small body of troops of the regular army, who, under Barras and Bonaparte, defeated the Convention. After this reverse the National Guard ceased practically to exist. In 1805, Napoleon re-instituted the Garde Nationale, taking care that no elective or democratic principles should pervade the body. From that time it led a precarious existence through the political changes that have made the history of modern France, and in 1871, the French National Assembly decreed to dissolve it, leaving the prefects of departments to choose the time of executing the decree, and at present this body may be considered abolished.

GARDENIA, a genus of trees and shrubs, of the natural order *Cinchonaceæ*, natives of tropical and sub-tropical countries, many of which are favorites on account of their beautiful and fragrant flowers. Some of them are hardy enough to endure the open air in summer. The corolla is funnel-shaped, or approaching to salver-shaped, the tube much longer than the calyx; the fruit is a berry crowned with the calyx. *G. florida* and *G. radicans* are among the species best known, and bear the name of Cape jasmine, but are natives of Japan.

GARDENING. See HORTICULTURE.

GARDINER, a city in Kennebec county, Me., is situated at the junction of the Kennebec and Cobscook rivers, ten miles south by east of Augusta. The water-power of the Cobscook river is much utilized for manufactures, and the town has saw-mills, paper-mills, iron foundries, a woolen factory, a tannery, a pottery, and manufactories of sashes and blinds, and is the headquarters of the ice-business on the Kennebec. Population (1890), 5,484.

GARDINER, COLONEL JAMES, a Scottish soldier, was born at Carriden in Linlithgowshire, January 10, 1687. At the age of fourteen he entered a Scottish regiment in the Dutch service, and was afterward present at the battle of Ramillies, where he was wounded. He subsequently served in different cavalry regiments, and in 1730 was advanced to the rank of lieutenant-colonel, and in 1743 to that of colonel. He fell at the battle of Prestonpans, September 1, 1745. The circumstances of his death are described in Sir Walter Scott's

novel of *Waverley*. Gardiner in his youth was notorious for his licentiousness, but in 1719 became a Christian, in consequence of a vision.

GARDINER, STEPHEN, bishop of Winchester and lord chancellor of England, was born at Bury St. Edmunds in 1483. He is believed to have been the illegitimate son of Dr. Woodville, bishop of Salisbury, brother of Elizabeth Woodville, queen of Edward IV. If so, he lost his father when he was only one year old; but his education seems to have been carefully provided for. He was sent to Cambridge and studied at Trinity Hall, where he greatly distinguished himself in the classics, especially in Greek. He afterward devoted himself to the canon and civil law, in which subjects he attained so great a proficiency that no one could dispute his preëminence. He received the degree of doctor of civil law in 1520, and of canon law in the following year. Ere long his abilities attracted the notice of Cardinal Wolsey, who made him his secretary, and in this capacity he is said to have been with him at More Park in Hertfordshire, when the conclusion of the celebrated treaty of the More brought Henry VIII. and the French ambassadors thither. It is stated, and with great probability, that this was the occasion on which he was first introduced to the king's notice, but he does not appear to have been actively engaged in Henry's service till three years later. In that of Wolsey, he undoubtedly acquired a very intimate knowledge of foreign politics, and in 1527 he and Sir Thomas More were named commissioners on the part of England in arranging a treaty with the French ambassadors for the support of an army in Italy against the emperor. That year he accompanied Wolsey on his important diplomatic mission to France. Among the imposing train who went with the cardinal—including, as it did, several noblemen and privy councilors—Gardiner alone seems to have been acquainted with the real heart of the matter which made his embassy a thing of such peculiar moment. Henry was then particularly anxious to cement his alliance with Francis I.

It was owing to Gardiner's vigorous advocacy that the celebrated commission was issued to Cardinals Wolsey and Campeggio to try the cause in England. After obtaining it he was recalled, but early in the following year, 1529, as Campeggio delayed proceeding, he was sent once more to Rome. This time, however, his efforts were unavailing. The pope would make no further concessions, and would not even promise not to revoke the cause to Rome, as he did very shortly after. Gardiner's services, however, were fully appreciated. He was appointed the king's secretary. He had been already some years arch-deacon of Taunton, and the archdeaconry of Norfolk was added to it in March, 1529, which two years later he resigned for that of Leicester. In 1530 he was sent to Cambridge to procure the decision of the university as to the unlawfulness of marriage with a deceased brother's wife, in accordance with the new plan devised for settling the question without the pope's intervention. In this he succeeded, though not without a good deal of artifice, more creditable to his ingenuity than to his virtue. In November, 1531, the king rewarded him for his services with the bishopric of Winchester, vacant by Wolsey's death. It must be owned, however, that his next distinguished service was not a very creditable one; for he was, not exactly, as is often said, one of Cranmer's assessors, but, according to Cranmer's own expression, "assistant" to him as counsel for the king, when the archbishop, in the absence of Queen Catherine, pronounced her marriage with Henry null and void on May 23, 1533. Immediately afterward he was sent over to Marseilles, where an interview between the pope and



Francis I. took place in September, of which event Henry stood in great suspicion, as Francis was ostensibly his most cordial ally, and had hitherto maintained the justice of his cause in the matter of divorce. Here he intimated the appeal of Henry VIII. to a general council in case the pope should venture to proceed to sentence against him. He also made a like appeal in behalf of Cranmer. Next year he and other bishops were called upon to vindicate the king's new title of "Supreme Head of the Church of England." The result was his celebrated treatise *De Vera Obedientia*, the ablest, certainly, of all the vindications of royal supremacy. In 1535 he had an unpleasant dispute with Cranmer about the visitation of his diocese. During the next few years he was engaged in various embassies in France and Germany. He was, indeed, so much abroad that he had little influence upon the king's councils. But in 1539 he was much concerned in the drawing up and passing through the House of Lords of the severe statute of the Six Articles, which led to the resignation of Bishops Latimer and Shaxton and the persecution of the whole Protestant party. In 1540, on the death of Cromwell, earl of Essex, he was elected chancellor of the University of Cambridge. A few years later he attempted, in concert with others, to fasten a charge of heresy upon Archbishop Cranmer in connection with the act of the Six Articles; and, but for the personal intervention of the king, he would probably have succeeded. He was, in fact, though he had supported the royal supremacy, a thorough opponent of the Reformation in a doctrinal point of view, and it was suspected that he even repented his advocacy of the royal supremacy. He certainly had not approved of Henry's general treatment of the church, especially during the ascendancy of Cromwell, and he was frequently visited with storms of royal indignation, which he schooled himself to bear with patience. In 1544, a relation of his own, named German Gardiner, whom he employed as his secretary, was put to death for treason in reference to the king's supremacy, and his enemies insinuated to the king that he himself was of his secretary's way of thinking. But being warned of his danger, he sought an interview with Henry, in which he succeeded in clearing himself of all injurious imputations. That he was party to a design against Queen Catherine Parr, whom the king was at one time on the point of committing to the Tower, rests only upon the authority of Foxe, and seems a little doubtful. It is certain, however, that his name was omitted at the last in Henry's VIII.'s will, though the king was believed to have intended making him one of his executors.

Under Edward VI. Gardiner was completely opposed to the policy of the dominant party both in ecclesiastical and in civil matters. The religious changes he objected to both on principle and on the ground of their being moved during the king's minority, and he resisted Cranmer's project of a general visitation. His remonstrances, however, were met by his own committal to the Fleet, and the visitation of his diocese was held during his imprisonment. Though soon afterward released, it was not long before he was called before the council, and, refusing to give them satisfaction on some points, was thrown into the Tower, where he continued during the whole remainder of the reign, a period slightly over five years. During this time he in vain demanded his liberty, and to be called before parliament as a peer of the realm. His bishopric was taken from him and given to Doctor Poynt, a chaplain of Cranmer's, who had not long before been made bishop of Rochester. At the accession of Queen Mary, the duke of Norfolk and other state prisoners of high rank were in the Tower along with him; but the queen, on her first

entry into London, set them all at liberty. Gardiner was restored to his bishopric, and appointed lord chancellor, and he set the crown on the queen's head at her coronation. He also opened her first parliament, and for some time was her leading councilor. He was now called upon, at the age of seventy, to undo not a little of the work in which he had been instrumental in his earlier years—to vindicate the legitimacy of the queen's birth and the lawfulness of her mother's marriage, to restore the old religion, and to recant what he himself had written touching the royal supremacy. At least this, it may be presumed, was the time when he wrote, if, as we are told, he really did write, a *Palinodia* or retraction of his book *De Vera Obedientia*, which, however, does not seem to be now extant, so that how far he had changed his sentiments we cannot very well judge. That he should have really changed them to some extent is not at all unnatural; and in relation to the divorce of Catherine of Aragon, we may well believe that it was his earlier and not his later action that ever troubled his conscience. Yet as to the royal supremacy, it seems that he would have advised Queen Mary to retain it; but her own desire was so great to give up ecclesiastical jurisdiction to the pope that he could not press the matter. A less agreeable task which fell to him was the negotiation of the queen's marriage treaty with Philip, to which he shared the general repugnance, though he could not oppose her will. In executing it, however, he took care to make the terms as advantageous for England as possible, and to make express provision that the Spaniards should in no wise be allowed to interfere in the government of the country. After the coming of Cardinal Pole and the reconciliation of the realm to the see of Rome, his influence suffered some eclipse, though he still remained in high favor. How far he was responsible for the persecutions which afterward arose is a debated question. There is no doubt that he sat in judgment on Bishop Hooper, and several other Protestants whom he condemned to the flames. But being placed on a commission along with a number of other bishops to administer a severe law, it does not appear that he could very well have acted otherwise. On the bench he is said to have used every effort to induce the accused to make concessions and accept a pardon; and a remarkable instance of his clemency is recorded by the church historian Fuller, who, notwithstanding his prejudices, acknowledges a debt of gratitude to him for preserving one of his own ancestors from the persecuting zeal of others. It would seem, moreover, that when he saw the results of the cruel proceedings against heretics, he very soon got tired of them. The persecutions raged with the greatest vehemence during his absence at the Calais peace conferences in 1555, and when he came back he declared he would have no further hand in them, so that those afterward apprehended in his diocese were removed into that of London in order to be adjudged to the flames. In October, 1555, he again opened parliament as lord chancellor, but toward the end of the month he fell ill and grew rapidly worse till November 12th, when he died about the age of seventy-two.

GARDNER, a thriving town of Massachusetts, situated in Worcester county, having considerable commerce, railroad, banking and telegraph facilities, and a growing population—at present (1890) 8,424.

GARE-FOWL, the Anglicized form of the Hebridean name of a large sea-bird, formerly a visitor to certain remote Scottish islands, the GREAT AUK of most English book-writers, and the *Alca impennis* of Linnaeus. In size it was hardly less than a tame goose, and in appearance it much resembled its smaller and surviving relative the Razor-bill (*Alca torda*); but the glossy-



black of its head was varied by a large patch of white occupying nearly all the space between the eye and the bill, in place of the Razor-bill's thin, white line, while the bill itself bore eight or more deep transverse grooves instead of the smaller number and the ivory-like mark possessed by the species last named. Otherwise the coloration was similar in both, and there is satisfactory evidence that the Gare-fowl's winter-plumage differed from that of the breeding-season just as is ordinarily the case in other members of the family *Alcidae* to which it belongs. The most striking characteristic of the Gare-fowl, however, was the comparatively abortive condition of its wings, the distal portions of which, though the bird was just about twice the linear dimensions of the Razor-bill, were almost exactly of the same size as in that species—proving, if more direct evidence were wanting, its inability to fly.

GARESSIO, GARESSO, or GAREZZO, in Latin *Garexium*, a town of Italy about eighteen miles south-east of Mondovì, in the valley of the Tararo. The Roman remains which are discovered from time to time bear witness to its high antiquity; during the Middle Ages it was the seat of a marquisate, which in 1509 was sold to the Spinola family, and its double walls gave it some importance as a defensible position.

GAR-FISH is the name given to a genus of fishes (*Belone*) found in nearly all the temperate and tropical seas, and readily recognized by their long, slender, compressed and silvery body, and by their jaws being produced into a long, pointed, bony and sharply-toothed beak. About fifty species are known in different parts of the globe, some attaining a length of four or five feet. (See ICHTHYOLOGY.)

GARGANEY, or SUMMER-TEAL. About the same size as the common Teal, the male is readily distinguished therefrom by its peculiarly-colored head, the sides of which are nutmeg-brown, closely freckled with short whitish streaks, while a conspicuous white curved line descends backward from the eyes. The upper wing-coverts are bluish-gray, the scapulars black with a white shaft-stripe, and the wing-spot grayish-green bordered above and below by white. The female closely resembles the hen Teal, but possesses nearly the same wing-spot as her mate.

GARHWÁL, a district of British India, in the Kumáon division, under the jurisdiction of the lieutenant-governor of the North-Western Provinces.

GARLIC, *Allium sativum*, Linn., a bulbous perennial plant of the tribe *Hyacinthineæ* of the natural order *Liliaceæ*, indigenous apparently to the south of Europe and to the East. Garlic possesses stimulant and stomachic properties, and was of old, as still sometimes now, employed as a medicinal remedy. Pliny gives an exceedingly long list of complaints in which it was considered beneficial. Doctor Sydenham valued it as an application in confluent small-pox, and, says Cullen, found some dropsies cured by it alone. The volatile oil has proved efficacious in indigestion.

GARNET, a mineral, the name of which is derived from the Latin *granatum*, the pomegranate, or, as Lydgate calls it, "garnet appille," on account of the resemblance of its granular varieties to the seeds of that fruit. Garnet occurs in crystals, mostly dodecahedral or trapezohedral, very rarely octahedral, of the isometric, regular, or cubical system, also in pebbles and grains (as in alluvial deposits), and massive, with a granular or coarse lamellar structure. It varies in diaphaneity from transparent to nearly opaque; is red, red-brown, or black in color, less frequently white, yellow, pink or green; has a vitreous to resinous luster, a white streak, dodecahedral cleavage and an uneven sub-conchoidal fracture; and is brittle and somewhat friable,

or, in the compact cryptocrystalline varieties, tough. GARNIER, GERMAIN, an able writer on political economy, was born at Auxerre, on November 8, 1754. He died at Paris, October 4, 1821.

GARNIER, MARIE JOSEPH FRANCOIS, usually called Francis Garnier, a French officer and explorer, was born at St. Etienne, July 25, 1839, and perished by assassination in Tong-king, December 7, 1873.

GARNIER, ROBERT (1534-90), a French tragedian, the most distinguished of the predecessors of Corneille.

GAROFALO, BENVENUTO. See TISIO.

GARONNE, HAUTE, or UPPER GARONNE, is one of the frontier departments in the south of France, being continuous with Spain along the line of the Pyrenees. To the north lies the department of Tarn-et-Garonne, to the east are those of Tarn, Aude, and Ariège, and to the west those of Gers and Hautes-Pyrénées. The form of the department is very irregular. Its greatest length is ninety-nine miles from northeast to southwest, and its greatest breadth about fifty-six miles; but its area only amounts to 629,000 hectares, or 2,428 square miles. The northern portion is a fertile but mountainous stretch of country with continual interchange of hill and valley nowhere thrown into striking relief; while toward the south the land rises gradually to the Pyrenees, which there attain a height of upward of 11,000 feet. All the streams by which the department is watered—the Neste, the Salat, the Lers, the Logue, the Touche, etc.—belong to the system of the river from which it takes its name. Except in the mountainous region the climate is mild, the mean annual temperature being rather higher than that of Paris. The rainfall, which averages twenty-three inches at Toulouse and twenty-six at St. Gaudens, is distributed over 125 days. The winds are often violent. Thick forests of oak, fir, and pine exist in the mountains, and furnish timber for ship-building. The arable land (360,241 hectares, or 890,207 acres) is well adapted for the cultivation of wheat, maize, and other grain crops; and the produce of cereals is generally much more than is required for the local consumption. Oats, buckwheat, barley, flax, colza, and potatoes are all grown; fruit is plentiful, and about 54,000 hectares, or 133,441 acres, are occupied by vineyards, though the wine is only of medium quality. As pasture land is abundant, a good deal of attention is given to the rearing of cattle and sheep; and owing to the mountainous character of the southern region asses and mules are favorite beasts of burden, and may be estimated at 24,000 in number. Iron, lead, copper, and coal are among the mineral productions, as well as marble, both white and variegated, granite, freestone, lime, and slate. The manufactures are various though not individually extensive, and include iron and copper utensils, earthenware, woolen, cotton and linen goods, leather, paper, watches, mathematical instruments, etc. Railway communication is furnished by the line from Bordeaux to Cette, which passes by Toulouse, and there sends off branch lines leading to Albi, Auch, Foix, St. Giron, and Bagnères du Luchon. The Canal du Midi traverses the department for thirty two miles. There are four arrondissements—Toulouse, Villefranche, Muret, and St. Gaudens, subdivided into thirty-nine cantons and 585 communes. The chief town, Toulouse, contained 126,208 inhabitants in 1888; but there is no other town of even 5,000 in the department, the largest being St. Gaudens with 4,087. The population of Haute Garonne is about 500,000.

GARONNE, the ancient *Garumna*, a river of southern France, which rises in the Spanish Pyrenees not far from the massif of Maladetta, flows through the fine gorge called the Val d'Aran, partly loses itself under the calcareous rocks that form the gulf of Clédes,



enters France near the Pont du Roi, and proceeds in a general northwest direction till it falls into the Bay of Biscay. Rafts can be sent down the river from the Spanish frontier; boats can pass with the stream from the confluence of the Salat to Toulouse; from Toulouse downward regular navigation with boats can be maintained; and seafaring vessels can sail up as far as Castets, thirty-two miles above Bordeaux. At Bec d'Ambes, near the confluence of the Dordogne, the river widens out to a breadth of from two to four miles, and takes the name of the Gironde. This estuary presents an almost uninterrupted succession of islands and banks, which divide it into nearly equal branches, and render the navigation somewhat difficult. At the mouth stands the famous tower of Cordouan, which dates from 1584-1610, and ranks as one of the finest lighthouses on the coast of France.

GARRICK, DAVID, the greatest actor of his age, and the most successful of English theatrical managers, was descended from a good French Protestant family of Bordeaux, which had settled in England on the revocation of the edict of Nantes. His father, Capt. Peter Garrick, was on a recruiting expedition when his celebrated son was born at Hereford on February 19, 1716-17. The captain usually resided at Lichfield on half pay, but, in order to benefit his large family, he accepted an offer to proceed on service to Gibraltar, in place of a brother officer who was desirous of returning to England. This kept him many years absent from home, and the letters written to him by "little Davy," acquainting him with the doings at Lichfield, are highly interesting memorials of the future Roscius. In his nineteenth year, after receiving a good education at the grammar school of Lichfield, David was sent to the establishment at Edial, opened in June or July, 1736, by Samuel Johnson, his senior by seven years. The Edial academy was shut in about six months, and on March 2, 1736-7, master and pupil, Johnson and Garrick, left Lichfield for London, the one to commence the study of the law, and the other to try his tragedy of *Irene*—Johnson, as he afterward said, "with twopence halfpenny in his pocket," and Garrick "with three-halfpence in his." Seven days afterward, however, Garrick was entered of Lincoln's Inn, but after remaining for a few months in London, he resided for some time with Mr. Colson, a distinguished teacher at Rochester afterward Lucasian (professor at Cambridge). Captain Garrick, who had returned from Gibraltar, died about a month after his son's arrival in London. Soon afterward a rich uncle, a wine merchant at Lisbon, in his will left David a sum of £1,000, and he and his brother entered into partnership as wine merchants in London and Lichfield. The concern was not prosperous—though Foote's assertion that he had known Garrick with three quarts of vinegar in the cellar calling himself a wine merchant need not be taken literally—and before the end of 1741 he had spent nearly half of his £1,000. His passion for the stage completely engrossed him; he tried his hand both at dramatic criticism and at dramatic authorship, and made his first appearance on the stage late in 1740-1, *incognito*, as harlequin at Goodman's Fields, where Woodward, being ill, allowed him to take his place during a few scenes. When the manager of the same theater, Giffard, took a party of players to Ipswich, Garrick accompanied them, and there made his first essay as an actor under the name of Lyddal, in the part of the black "Aboan" (in Southerne's *Oroonoko*). His success on the provincial boards determined his future career. On October 19, 1741, he made his appearance at Goodman's Fields in the character of "Richard III.," and gained the most enthusiastic applause. His staid and sedate brother, and

his sisters at Lichfield, were scandalized at this derogation from the provincial dignity of the family; and Garrick, greatly distressed at the shock they had received by the intelligence (which, however, he expected) hastened to give up his interest in the wine company. Each night added to his popularity on the stage. He was received by the best company in town. While his "Richard" was still calling forth the general admiration, he won new applause in "Lear" and "Pierre," as well as in several comic characters (including that of "Bayes"). Glover ("Leonidas") attended every performance; Lyttelton, Pitt, and several other members of parliament had shown him the greatest civility. From December 2d he appeared in his own name. Pope went to see him thrice during his first performances, and pronounced that "that young man never had his equal as an actor, and he will never have a rival." Before next spring he had supped "with the great Mr. Murray, counselor," and hoped to do so with Mr. Pope through Murray's introduction, while he was dining with Halifax, Sandwich and Chesterfield. "There are a dozen of dukes of a night at Goodman's Fields," writes Horace Walpole. *The Lying Valet* being at this time brought out with success, the honors of dramatic author were added to those of the stage. His fortune was now made, and while the managers of Covent Garden and Drury Lane resorted to the law to make Giffard close his little theater, Garrick was engaged by Fleetwood for Drury Lane for the season of 1742. In the meantime, having very advantageous terms offered him for performing in Dublin during part of the summer, he went over to that city, where he found the same homage paid to his merit which he had received from his own countrymen. From September, 1742, to April, 1745, he continued at Drury Lane, after which he again went over to Ireland, and remained there the whole season, as joint manager with Sheridan, in the direction and profits of the theater royal in Smock Alley. From Dublin he returned to England, and fulfilled a short engagement in 1746-7, with Rich at Covent Garden. This was his last series of performances as a hired actor, for in the close of the season Fleetwood's patent for the management of Drury Lane expired, and Garrick, in conjunction with Lacy, purchased the property of the theater, together with the renovation of the patent, and in the winter of 1747 opened it with a strong company of actors, the prologue for the occasion being written by his old preceptor Johnson.

After about the year 1745, escaping from the chains of an unreturned passion for the beautiful but reckless actress "Peg" Woffington, Garrick had, in 1749, married Mademoiselle Violette (Eva Maria Veigal) a German lady who had attracted the admiration of the court of Vienna as a dancer, and was patronized in England by the countess of Burlington. This lady Garrick called "the best of women and wives," and he lived most happily with her in his villa at Hampton (acquired by him in 1754, and adorned by the famous Shakespeare temple), whither he was glad to escape from his house in Southampton street. Their union was childless, and Mrs. Garrick survived her husband, living in great respect until 1822. Having sold the moiety of his theater for £35,000, Garrick took leave of the stage by playing a round of his favorite characters—"Hamlet," "Lear," "Richard," "Lusignan," and "Kiteley," as the graver; "Archer," "Abel Drugger," "Sir John Brute," "Benedick," "Leon," and "Don Felix," as those of a lighter cast. He ended the series with "Don Felix" (in *The Wonder*) on June 10, 1776. But he was not long to enjoy his opulent and well-earned repose, for he died in London on January 20, 1779. He was buried in Westminster Abbey with imposing solemnity.



ties, and amidst an unexampled concourse of people of all ranks.

GARRISON, WILLIAM LLOYD, American abolitionist, was born in Newburyport, Mass., December 10, 1805. He, owing to his early deprivation of a father's care, had but a meager education, and was successively apprenticed first to a shoemaker, then to a cabinet-maker, and finally to a master printer, E. W. Allen, proprietor of the Newburyport *Herald*. This occupation proving congenial, he had not long worked at it before he commenced writing anonymously for the *Herald*, and his communications pleased his employer, who had no knowledge of their author. He also contributed, under cover of a *nom de guerre*, to other papers, and some of his political essays were attributed to Timothy Pickering, who was at that time at the zenith of his fame as a writer and statesman. In 1826, on the expiration of his apprenticeship, he began the publication of a newspaper, the *Free Press*, but the enterprise was short-lived. After working for a time in Boston at his trade, he became the editor of the temperance organ, the *National Philanthropist*. Here he remained but a short time, withdrawing when the paper changed owners. His next venture was the *Journal of the Times*, which he established in 1828, at Bennington, Vt., and which did not long survive his withdrawal from it, which withdrawal was occasioned by his going to Baltimore to edit an abolitionist paper, the *Genius of Universal Emancipation*. For an article published in this paper he was fined \$50 and costs, and imprisoned in default of payment, from which position he was released through the efforts of Arthur Tappan, who paid the fine and costs for him, at the solicitation of friends. His connection with the paper was then severed, and he returned to Boston, where, after delivering a few lectures on abolition in the hall of an infidel association, he established, in 1831, a paper called the *Liberator*, the principles of which he announced as "Our country is the world—our countrymen are mankind." For a long time the paper had but a precarious existence, but Garrison was undaunted, and after the death of his partner, Mr. Knapp, carried on the fight single-handed, and his paper lived on till slavery was forever abolished in the United States.

In 1832 he founded the "New England Anti-Slavery Society," and published his *Thoughts on African Colonization*, in which he dealt the death-blow to the "American Colonization Society"—an association of equivocal character, which really favored the maintenance of slavery. In 1833 he was sent to England to confer with English abolitionists, and was everywhere received with assurances of sympathy and coöperation. In the latter part of the year he returned and organized the "American Anti-Slavery Society," and brought to the United States George Thompson, who was engaged to lecture against slavery in the principal American cities. Mr. Thompson remained but a short time, having been met with so much opposition and violence that he was forced to return to England. Garrison himself did not escape, and was dragged through the streets of Boston with a rope, and otherwise maltreated and badly used. But the movement could not be suppressed, and although Garrison was never an advocate of violent measures, he was times without number the victim of violent persecutions. He was, before the war, an advocate of the peaceful dissolution of the union between the slaveholding and "free" States, but when the war began and he saw that slavery would perish in the fray, he was an ardent supporter of the war administration. When the logic of events had established the correctness of his position and slavery was dead, he counseled the cessation of further agitation on the subject and the disband-

ing of the Abolitionist societies. He also discontinued his paper, the *Liberator*, after having published it thirty-five years. He visited England several times subsequent to his first visit, and was always the recipient of distinguished honors. He died in New York, May 24, 1879, aged seventy-three, and was buried with solemn and impressive services in the city of Boston—the scene of so many of his humiliations and trials.

GARTER, ORDER OF THE. See KNIGHTHOOD.

GARTH, SIR SAMUEL, a physician and poet of the age of Anne, was probably born in 1670. He published in 1699 a mock-heroic poem, *The Dispensary*, in six cantos, which had an instant success. In 1714 he was knighted by George I., and he died on January 18, 1718-19. He wrote little besides his best-known work *The Dispensary*, and *Claremont*, a moral epistle in verse. In 1717 he edited a translation of Ovid's *Metamorphoses*.

GAS AND GAS-LIGHTING. All artificial light is obtained as a result either of combustion or of incandescence; or it might be more accurate to classify illuminating agents as those which emit light as a result of chemical action, and those which glow, from the presence of a large amount of heat, without thereby giving rise to any chemical change. The materials whence artificial light of the nature of flame has been derived are principally bodies rich in carbon and hydrogen. Wax, fats and oils, on exposure to a certain amount of heat, undergo destructive distillation, evolving inflammable gases; and it is really such gases that are consumed in the burning of lamps and candles, the wicks bringing small proportions of the substances into a sufficient heat. Wood and coal also, when distilled, give off combustible gases; and ordinary gas-lighting only differs from illumination by candles and lamps in the gas being stored up and consumed at a distance from the point where it is generated.

Inflammable gas is formed in great abundance within the earth in connection with carbonaceous deposits, such as coal and petroleum; and similar accumulations not unfrequently occur in connection with deposits of rock-salt; the gases from any of these sources, escaping by means of fissures or seams to the open air, may be collected and burned in suitable arrangements. Thus the "eternal fires" of Baku, on the shores of the Caspian Sea, which have been known as burning from remote ages, are due to gaseous hydrocarbons issuing from and through petroleum deposits. In the province of Szechuen, in China, gas is obtained from beds of rock-salt at a depth of 1,500 or 1,600 feet: being brought to the surface, it is conveyed in bamboo tubes and used for lighting as well as for evaporating brine; and it is asserted that the Chinese used this naturally evolved gas as an illuminant long before gas lighting was introduced among European nations. At a salt mine in the comitat of Marmaro in Hungary, gas is obtained at a depth of about 120 feet, and is used for illuminating the works of the mine. Again at Fredonia (New York State) a natural emission of gas was discovered in a bituminous limestone, over the orifice of which a gasholder has been erected, and thus about 1,000 cubic feet of a gas composed of marsh gas and hydride of ethyl has been made available for illumination. In the city of Erie (Pa.) there are thirteen gas-wells, each yielding from 10,000 to 30,000 feet per day, the gas escaping from one of them at a pressure of 200 pounds per square inch. At Bloomfield, Ontario County, New York, there is a spring which yields daily no less than 800,000 feet of gas of an illuminating power equal to fourteen and one-half candles. The city of East Liverpool (Ohio) is entirely illuminated, and to a large extent heated, by gas-wells which exist in and around the town. The light is of



extraordinary brilliancy, and is so abundant and free that the street lamps are never extinguished, and much of the manufacturing steam-power of the town, which embraces twenty-two potteries, giving employment to 2,000 hands, is derived from the gas. The first "well," 450 feet deep, was opened in 1859, and up to the present year neither it nor any of those tapped at later dates show any sign of failing. In Indiana and many other parts of America similar gas-wells exist; and several such natural jets of gas have been observed in England.

By general consent the merit of the discovery and application of artificial gas belongs to Great Britain, and the name most honorably connected with the beginning and early stages of gas-lighting is that of a Scotchman — Robert Murdoch. But previous to Murdoch's time there occurred numerous suggestive observations and experiments as to inflammable air and its sources.

Artificial gas is now distilled from a variety of substances, among which are coal, shale, lignite, petroleum, water, turf, wood, resins, oils, and fats; and it is also prepared by carbureting or impregnating with volatile hydrocarbons other non-luminiferous gases. Of the very numerous systems of gas-making which have been proposed since the early part of the century, none can compete for general purposes with the ordinary coal-gas process, when a supply of the raw material can be obtained at a moderate expense.

*Coal-Gas.*—Coals varying greatly as they do in chemical constitution, differ also, as might be expected, as widely in their value and applicability for the manufacture of gas. Taking the leading varieties of coal to be included under anthracite, bituminous coal, and lignite or brown coal, we find that it is the class bituminous coal alone that yields varieties really serviceable for gas-making. Anthracite may be regarded as a natural coke from which the volatile constituents have been already driven off, and the more anthracite any coal is, the less it is capable of yielding gas. Lignite is also rarely used for distillation, owing to the large proportion of oxygen and the amount of water in the composition. Of the bituminous coals again, it is only the coking or pitch coals, and the cannel or parrot coals, that are in practice used in gas-works. These also vary within very wide limits in their gas-making value, not only from the great difference among them in yield of gas, but also in the illuminating value of the gas they evolve. As a rule the coals which yield the largest percentage produce also the most highly illuminating qualities of gas.

The series of operations connected with the preparation and distribution of coal-gas embrace the processes of distillation, condensation, exhaustion, scrubbing or washing, purification, measuring, storing, and distribution by the governor to the mains, whence the consumer's supply is drawn. In connection with consumption, pressure of the gas, measurement of the amount consumed, and the burners and other arrangements for lighting are the most important considerations.

*Retorts.*—Retorts for destructive distillation of coal are formed of cast iron, clay, brick, or wrought iron. Various shapes have been adopted in the construction of these vessels; nor have their forms been more varied than the modes in which they have been disposed in the furnaces. In many instances they have been constructed of a cylindrical shape varying in length and diameter. Those first employed were of iron, with the axis vertical, but experience soon showed that this position was extremely inconvenient, on account of the difficulty which it occasioned in removing the coke.

The retorts were therefore next placed in a horizontal position, as being not only more favorable to the

most economical distribution of the heat, but better adapted to the introduction of the coal and the subsequent removal of the coke. At first the heat was applied directly to the lower part of the retort; but it was soon observed that the high temperature to which it was necessary to expose it, for the perfect decomposition of the coal, proved destructive to the lower side, and rendered it useless long before the upper part had sustained much injury. The next improvement was, accordingly, to interpose an arch of brickwork between it and the furnace, and to compensate for the diminished intensity of the heat, by a more equally diffused distribution of it over the surface of the retort. This was effected by causing the flue of the furnace to return toward the mouth of the retort, and again conducting it in an opposite direction, till the heated air finally escaped into the chimney. This arrangement was continued so long as iron retorts were in use, but on the general adoption of clay retorts the furnaces were constructed to allow the fire to play freely around them.

*The Hydraulic Main.*—From the retorts, the gas after its production ascends by means of pipes called ascension-pipes into what is termed the condensing or hydraulic main, which is a large pipe or long reservoir placed in a horizontal position, and supported by columns in front of the brickwork which contains the retorts. This part of a gas apparatus is intended to serve a twofold purpose; first to condense the tar and some ammoniacal liquor, and second, to allow each of the retorts to be charged singly without permitting the gas produced from the others, at the time that operation is going on, to make its escape. To accomplish these objects one end of the hydraulic main is closed by a flange; and the other, where it is connected with the pipes for conducting the gas toward the tar vessel and purifying apparatus, has, crossing it in the inside, a partition occupying the lower half of the area of the section, by which the condensing vessel is always kept half full of liquid matter. The stand-pipes are connected by a flange with a dip-pipe arising from the upper part of the condensing main, and as the lower end of it dips about two inches below the level of the liquid matter, it is evident that no gas can return and escape when the mouth-piece on the retort is removed, until it has forced the liquid matter over the bend, a result which is easily prevented by making it of a suitable length. The tar which is deposited in the hydraulic main overflows at the partition, and is carried by a pipe to the tar well.

*Condensation.*—The gas as it passes on from the hydraulic main is still of a temperature from 130° to 140° Fahr., and consequently carries with it heavy hydrocarbons, which, as its temperature falls, would be deposited. It is therefore a first consideration in ordinary working to have these condensable vapors at once separated, and the object of the condenser is to cool the gas down to a temperature nearly that of the surrounding atmosphere. The first contrivances employed for the purpose of condensation were all constructed on the supposition that the object would be best attained by causing the gas to travel through a great extent of pipe surrounded by cold water, and winding through it like steam in the worm of a still, or ascending and descending in a circuitous manner. An improvement on this form of condenser is now in general use. It consists of a series of upright pipes connected in pairs at the top by semicircular pipes, and terminating at the bottom in a trough containing water, and divided by means of partitions in such a way that, as the gas enters the trough from one pipe, it passes up the next pipe and down into the next partition, and so on to the end of the condenser. The cooling power of this air condenser, as it is called, is sometimes assisted by allowing cold water to trickle



over the outer surface of the pipes. Annular tubes for condensing are also used, in which the gas is exposed to a much greater cooling surface, and in some large works the condensers are cooled by a current of water. In passing through the pipes the gas is considerably reduced in temperature, and the tar and ammoniacal liquor condense, the tar subsiding to the bottom of the troughs, and the ammoniacal liquor floating on the surface. In course of time the water in the trough is entirely displaced by these two gaseous products, and as they accumulate they pass off into the tar-tank, from which either liquor can be removed by means of a pump adapted to the purpose.

*Exhaustion.*—To the subsequent progress of the gas considerable obstructions are interposed in connection with its further purification and storing in the gas-holders, and the result of which would be that, were it not artificially propelled, there would be a pressure in the retort equal to the amount of the resistance the gas meets with in its onward progress. The relief of this back pressure not only improves the quality of the gas, but also increases its amount by about ten per cent.

*The Purifiers.*—The ordinary lime purifier, by which sulphureted hydrogen and carbonic acid are abstracted from the gas, consists of a large rectangular vessel. Internally it is occupied with ranges of wooden trays or sieves, made in the form of grids of one-half inch wood, with about half an inch between the bars. These are covered with slightly moistened slaked lime to the depth of about six inches, and from three to six such sieves are ranged in each purifier. The gas enters at the bottom by a tube, the mouth or inlet being protected from lime falling into it by a cover, and it forces its way upward through all the trays, till reaching the lid or cover, it descends by an internal pocket to the exit tube, which leads to the next purifier. The edges of the lid dip into an external water seal or lute whereby the gas is prevented from escaping. The purifiers are generally arranged in sets of four, three being in use, through which the gas passes in succession while the fourth is being renewed.

For the separation of the carbonic acid, which is unaffected by this treatment, the gas next passes on to a dry lime purifier. The gas is now ready for use, and it is passed on through the station meter to register the amount made and stored in the gas-holders.

*The Gas-holder.*—This, which is frequently designated the gasometer, though incorrectly, since it does not in any way measure gas, but simply stores it for consumption, consists of two portions—the “tank” and the “holder.” The tank is a cylindrical pit, surrounding a central core, which is usually covered with concrete at top, and has its sides built of masonry or brickwork. The tank is water-tight, and is filled to a high level with water, above which project two tubes, one being the inlet and the other the supply pipe, which leads to the main governor.

Formerly gas-holders were made of heavy plate iron, strengthened by angle-iron and stays, and of so great a weight as to require a complex system of equilibrium chains and counterbalancing weights to relieve the gas from the great pressure to which it would otherwise be subjected. They are now made so light that they require to be loaded in order to supply the required pressure, and their rise and fall are regulated by means of guide-rods around the tank. For economy of space, holders, in which different segments “telescope” over each other, are now much employed.

*The Governor.*—An efficient control of the pressure of the gas, along its whole course, from the gas-holder to the point of consumption, is an object of great importance for the avoiding of leakage, for equal distribu-

tion, and for supplying the burners at that pressure which yields the largest illuminating effect. Uncontrolled pressure may supply certain levels in a proper manner, but will leave low-lying districts insufficiently supplied, while the pressure in high districts will be excessive. The variations from simple difference of level may be very great. The varying consumption from dusk onward also greatly affects unregulated pressure. To control and correct these and other irregularities and disturbances, governors are now used—at the works or station for delivering the gas to the mains, in districts to correct variations owing to level, and beyond the consumers' meters for controlling house supply; while in certain forms of burners a regulating apparatus is also inserted. The principle on which all governors are based consists in causing the gas by its own pressure to act on some form of sensitive surface which opens or closes a valve or aperture in proportion to the variations of pressure exerted on it.

#### GAS FROM SOURCES OTHER THAN COAL.

*Petroleum-Gas.*—Petroleum being a substance obtained in great abundance, notably in America, is used, not only directly as an illuminating agent, but also for production of gas; and as an enricher of common coal-gas it is applied at several works in New York and Brooklyn. Its preparation is effected by distilling it first at a low temperature into a rich vapor, which, when passed into highly heated retorts, is converted into permanent gas of an illuminating power about five times greater than common gas, and which is, moreover, absolutely free from ammonia, sulphur compounds and carbonic acid. On account of its great richness, petroleum-gas must be consumed in special burners of very fine aperture, at a rate varying from five to two feet per hour.

*Oil-Gas.*—In the early stages of gas manufacture many attempts were made to substitute gas distilled from inferior oils for coal-gas. The oil was distilled by allowing it to percolate into highly heated retorts, in which a quantity of coke or a like porous solid was placed, and the distillate was a richly luminiferous gas free from hurtful impurities. Although oil in this form yields a convenient and powerful illuminant, its direct combustion is much more economical; and as all oils and fats are highly valuable for many purposes besides illumination, they cannot compete with gas-coal as a source of gas. Nevertheless the New York Gas Light Company manufactured oil-gas exclusively from 1824 till 1828, and sold their product at \$10 per 1000 feet. The distillation of suint from wool washing, and of recovered spent soap, are examples of the application of oleaginous substances for gas-making.

*Resin-Gas.*—In its treatment and results resin, as a source of gas, is very similar to oil. It yields a pure gas of great illuminating power, and for twenty years (1828-48) it was supplied in New York at \$7 per 1000 feet. Previous to the civil war of 1861-65 it was a good deal used on the European continent.

*Wood-Gas.*—The original experiments of Lebon, it will be remembered, were made with wood-gas, but he failed to obtain from his product an illuminating power that would compare with that of coal-gas. Lebon's failure was in later years shown to arise from distilling at a temperature which gave off chiefly carbonic acid with non-luminous carbonic oxide and light carbureted hydrogen, leaving in the retort a tar which the application of a higher heat would have resolved into highly luminiferous gases and vapors. Pettenkofer, who pointed out the fact, devised a system of wood-gas making in which the products of the low-heat distillation were volatilized by passing through a range of red-hot



pipes; but now it is found that ordinary retorts, properly heated and fed with small charges, answer perfectly well for the operation. Wood-gas, owing to its high specific gravity and the proportion of carbonic oxide it contains, must be burned at considerable pressure, in specially constructed burners with a large orifice. It is largely used in Germany, Switzerland, and Russia, where wood is more easily obtained than coal. It was used at Philadelphia gas-works in 1856, where it was affirmed to be cheaper and of greater luminosity than coal-gas.

*Peat-Gas* is evolved under circumstances the same as occur in connection with the wood-gas manufacture, but the amount of moisture contained in peat is a serious obstacle to its successful use in this as in most other directions. Earnest and persistent efforts have been made to use peat as a source of gas, but these have met but little commercial success. To a limited extent it is used in various German factories which happen to be situated in the immediate neighborhood of extensive peat deposits.

*Carbureted Gas.*—Under this head may be embraced all the methods for impregnating gaseous bodies with vapors of fluid or solid hydrocarbons. The objects aimed at in the carbureting processes are—(1) to increase the illuminating power of ordinary coal-gas; (2) to render non-luminous combustible gases, such as water-gas, luminiferous; and (3) so to load non-combustible gases with hydrocarbon vapor as to make the combination at once luminiferous and a supporter of combustion. The plan used in the United States for the making of water-gas is either the Lowe or Mothay system or a modification of both. The method used in New York and Chicago is the decomposition of superheated steam into hydrogen, and then adding petroleum vapor as a means of increasing its illuminating power. This is done by introducing into a cupola filled with white-hot anthracite coal a volume of superheated steam and then throwing on the surface of the coal crude petroleum or naphtha. The resultant vapor is then passed into another cupola filled with heated fire-bricks. The subsequent processes are the same as in coal gas manufacture. About 300 gallons of oil and 3,500 pounds of anthracite coal will make 75,000 feet of gas—much cheaper than coal gas.

GASCOIGNE, GEORGE, one of the great pioneers of Elizabethan poetry, was born about 1535—as is believed, in Westmoreland. He was the son and heir of Sir John Gascoigne. He studied at Cambridge, and was admitted to Gray's Inn in 1555. His youth was unsteady, and his father disinherited him. In 1565 he had written his tragi-comedy of *The Glass of Government*, not printed until 1576. In 1566 his first published verses were prefixed to a book called *The French Littleton*, and he brought out on the stage of Gray's Inn two very remarkable dramas, *Supposes*, the earliest existing English play in prose, and *Jocasta*, the first attempt to naturalize the Greek tragedy. Of the latter only the second, third and fourth acts were from his hand. Soon after this he married. In 1572 there was published *A Hundred sundry Flowers bound up in one small Posy*, a pirated collection of Gascoigne's lyrics, he having started in March of that year to serve as a volunteer under the Prince of Orange. He was wrecked on the coast of Holland and nearly lost his life, but obtained a captain's commission, and acquired considerable military reputation. An intrigue, however, with a lady in the Hague, nearly cost him his life. He regained his position, and fought well at the siege of Middleburg, but was captured under the walls of Leyden, and sent back to England after an imprisonment of four months. In 1575 he issued an authoritative edition of his poems under the name of *Posies*. In the summer of

the same year he devised a poetical entertainment for Queen Elizabeth, then visiting Kenilworth; this series of masques was printed in 1576 as *The Princely Pleasures*. Late on in 1575 he greeted the queen at Woodstock with his *Tale of Hemetes*, and presented her on next New Year's day with the MS. of the same poem, which is now in the British Museum. He completed in 1576 his two most important works, *The Complaint of Philomene*, and *The Steel Glass*, the first of which had occupied him since 1562; they were printed in a single volume. Later on in the same year he published *A Delicate Diet for Dainty-mouthed Drunkards*. He fell into a decline and died at Stamford on October 7, 1577.

GASCOIGNE, SIR WILLIAM, was chief-justice of England in the reign of Henry IV. Both history and tradition testify to the fact that he was one of the great lawyers who in times of doubt and danger have asserted the principle that the head of the state is subject to law, and that the traditional practice of public officers, or the expressed voice of the nation in parliament, and not the will of the monarch or any part of the legislature, must guide the tribunals of the country. The judge was a descendant of an ancient Yorkshire family. The date of his birth is uncertain, but it appears from the Year Books that he practiced as an advocate in the reigns of Edward III. and Richard II. On the banishment of Henry of Lancaster, Gascoigne was appointed one of his attorneys, and soon after Henry's accession to the throne was made chief-justice of the Court of King's Bench. After the suppression of the rising in the north in 1405, Henry eagerly pressed the judge to pronounce sentence upon Scrope, the archbishop of York, and the earl marshal Thomas Mowbray, who had been implicated in the revolt. The judge absolutely refused to do so, asserting the right of the prisoners to be tried by their peers. Although both were afterward executed, the chief-justice had no part in the transaction. The often told tale of his committing the Prince of Wales to prison has of course been doubted by modern critics, but it is both picturesque and characteristic. The judge had directed the punishment of one of the prince's riotous companions, and the prince who was present and enraged at the sentence struck or grossly insulted the judge. Gascoigne immediately committed him to prison, using firm and forcible language, which brought him to a more reasonable mood, and secured his voluntary obedience to the sentence. The king is said to have approved of the act, but there appears to be good ground for the supposition that Gascoigne was removed from his post or resigned soon after the accession of Henry V. He died in 1419, and was buried in the parish church of Harewood in Yorkshire.

GASCONY, an old province in the southwest of France, nearly identical with the *Novempopulania* or *Aquitania Tertia* of the Romans. Its original boundaries cannot be stated with perfect accuracy, but it included what are now the departments of Landes, Gers, and Hautes-Pyrénées, and parts of those of Haute-Garonne and Ariège. Its capital was Auch. (See AQUITANIA and GUIENNE.)

GASKELL, ELIZABETH CLEGHORN, one of the most distinguished of England's women-novelists, was born at Cheyne Row, Chelsea, September 29, 1810. During Elizabeth's childhood at Knutsford she was visited now and then by her sailor-brother; but while she was still a girl he went to India, where he somewhat mysteriously, and without any apparent motive, disappeared, and all further trace of him was lost. She was afterward sent for about two years to a school kept by a Miss Byerley, at Stratford-on-Avon, and on leaving school went for a



time to live with her father. Under his guidance she continued her studies, reading with him in history and literature, and working, chiefly by herself, at Latin, Italian, and French, in all of which she was, in later life, proficient. Having tenderly nursed her father in his last illness, she returned to her aunt at his death, in 1829; and, with the exception of one or two visits to Newcastle, London, and Edinburgh, she continued to live at Knutsford till her marriage. She had at this time a reputation for great beauty; and, even in later life, her exquisitely-shaped, soft eyes retained their light, and her smile its wonderful sweetness. Her marriage to the Rev. William Gaskell, M.A., of Cross Street Chapel, Manchester, took place August 30, 1832, at Knutsford church; and during the earlier years of her married life Mrs. Gaskell lived very quietly in Manchester, surrounded by a few intimate and cultured friends, and devoting all her time and abilities to the cares of a necessarily frugal household. She began by writing a short paper called *An Account of Clopton Hall*, for William Howitt's *Visits to Remarkable Places*. This was followed by one or two short stories, such as the *Sexton's Hero*, for the *People's Journal*; and then she wrote *Mary Barton, a Tale of Manchester Life*. On its completion, she sent it to one publisher in London, who rejected it unread, and then to Messrs. Chapman and Hall, who, after keeping the manuscript for a year without acknowledgment, wrote to her accepting the novel for publication, and offering the authoress £100 for the copyright. The appearance of *Mary Barton*, in 1848, caused great excitement in Manchester, and a strong partisanship was felt for and against its anonymous author. After its publication Mrs. Gaskell paid several visits in London, where she made many friends, among whom we may mention Dickens, Forster, Mrs. Jameson, Lord Houghton, Mrs. Stowe, Ruskin, and Florence Nightingale. But *Mary Barton* was to prove only the first of a series of scarcely less popular publications, which appeared either independently or in periodicals such as *Household Words*. It was followed, in 1850, by *The Moorland Cottage*. *Cranford* and *Ruth* appeared in 1853; *North and South*, in 1855; *The Life of Charlotte Brontë*, in 1857; *Round the Sofa*, in 1859; *Right at Last*, in 1860; *Sylvia's Lovers*, in 1863; and *Cousin Phillis* and *Wives and Daughters*, in 1865.

She died suddenly of heart disease, about 5 o'clock on Sunday evening, November 12, 1865.

GASSENDI, PIERRE, one of the most eminent French philosophers was born of poor but respectable parentage at Champtercier, near Digne, in Provence, on January 22, 1592. In 1612 he was called to the college of Digne to lecture on theology. Four years later he received the degree of doctor of theology at Avignon, and in 1617 he took orders as a priest. In the same year he was called to the chair of philosophy at Aix, and seems gradually to have withdrawn from the theological study and teaching. He died at Paris, on October 24, 1655, in the sixty-third year of his age.

GASTEIN, a beautiful and picturesque valley in the Austrian duchy of Salzburg, celebrated for its mineral springs. It is a side valley of the upper Salzach valley, and is about twenty-five miles long and one and one-quarter miles broad. It has an elevation of between 3,000 and 3,500 feet. Behind it, to the south, tower the mountains Malnitz or Nassfeld-Tauern, 7,820 feet high, and the Ankogel, 10,700 feet high, and from the right and left of these mountains two smaller ranges run northward, forming its two side walls. The river Ache traverses the valley, and near Wildbad-Gastein forms two magnificent waterfalls, the upper, the Kesselfall, 200 feet, and the lower, the Bärenfall, 280 feet in height;

and near these falls another called the Schleierfall, 250 feet high, is formed by the stream which drains the Pockhart-See. The principal villages are Böckstein, Hof-Gastein and Wildbad-Gastein, and the population of the whole valley is about 3,800.

GASTEROPODA, or GASTROPODS, a class of mollusks, inferior in organization to cephalopods, but far superior to almost all other mollusks, and containing a multitude of species, the greater number of which are marine, though some are inhabitants of fresh water, and some are terrestrial. Snails, whelks, periwinkles, limpets, cowries, and the greater number of mollusks with univalve shells belong to this class, and univalve mollusks constitute the greater part of it; but it contains also some mollusks with multivalve shells, as chitons, and some, as slugs, which have either only a rudimental internal shell, or no shell at all. Some aquatic kinds are destitute of shell in the adult state, but they are protected by a rudimentary shell on first issuing from the egg.

GASTROCHÆNA, a genus of lamellibranchiate mollusks, having a delicate shell of two equal valves, gaping in front; the animal sometimes taking possession of an already existing cavity, which it often lines with a calcareous lining, so as to form a tube, to which the valves of its shell are cemented; sometimes burrowing for itself in sand, madrepores, or calcareous rocks, and lining its hole with a shelly layer. *G. modiolina*, a mollusk common in the Mediterranean and other waters, perforates shells and limestone, making holes about two inches deep and half an inch in diameter. It sometimes bores right through an oyster into the ground below, and makes for itself a flask-shaped, case, with its neck fixed in the oyster-shell.

GASTROCNEMIUS MUSCLE, THE, is the muscle forming the greater part of the calf of the leg. It arises by two heads from the two condyles of the thigh bone, and is inserted by the tendo achillis at the posterior part of the heel-bone. In man, these muscles possess great power, and are constantly called in use in standing, walking, leaping, etc.

GASTRODIA, a genus of orchids. *G. sesamoides* is a native of Van Dieman's Land, the roots of which form large coral-like masses, and are sometimes called *native potatoes*, being edible; but they are watery and insipid.

GASTROSTOMY (Gr. *gaster*, the belly or stomach, and *stoma*, mouth), an operation which has been performed for the relief of stricture of the gullet, to relieve the patient from danger of starvation, by introducing food directly into the stomach through an external opening.

GASTROTOMY (Gr. *gaster*, and *tomein*, to cut), an incision into the cavity of the abdomen for the purpose of removing some diseased texture or foreign body. The term has also been applied to Cæsarean section.

GATAKER, THOMAS, a learned English divine, was born in London in 1574, and educated at St. John's College, Cambridge. From 1601 to 1611 he held the appointment of preacher to the society of Lincoln's Inn, which he resigned on obtaining the rectory of Rotherhithe. In 1642 he was chosen a member of the Assembly of Divines at Westminster. The parts of the Assembly's annotations on the Bible which were executed by him are those on Isaiah, Jeremiah and the Lamentations. At Westminster he disapproved of the introduction of the Covenant, and declared himself in favor of Episcopacy. He was also one of the forty-seven London clergymen who disapproved of the trial of Charles I. He died in 1654.

GATCHINA, a town of Russia, in the government of St. Petersburg and district of Tsarskoselo, twenty-



nine miles west of St. Petersburg. It is situated in a flat, well-wooded and partly marshy district, and on the south side of the town are two lakes, distinguished as the White and Black.

GATES, HORATIO, an American general, was born at Maldon in Essex, England, in 1728. He entered the English army at an early age, and soon obtained considerable promotion. He was severely wounded while accompanying General Braddock in his unfortunate expedition against the French settlements on the Ohio in 1755, and he took part in the expedition against Martinico in January, 1762. After the peace of 1763 he purchased an estate in Virginia, where he resided till the commencement of the revolutionary war in 1775, when he was named by congress adjutant-general. In 1776 he was appointed to command the army on Lake Champlain; but, his conduct there not having been approved of, he was superseded in the following spring; yet in August he was sent to oppose General Burgoyne, whom he totally defeated on the 16th of October, and compelled to surrender his whole army,—an achievement which was, however, largely due to the previous maneuvers of Schuyler, whom Gates superseded. After obtaining the chief command in the southern districts, Gates was totally defeated at Camden, in South Carolina, by Lord Cornwallis, on August 16, 1780. On this account he was superseded by General Greene; but an investigation into his conduct terminated in acquitting him fully and honorably of all blame, on the ground that his defeat had been unavoidable in the disorganized state of the army under his command. After this he again retired to his Virginia estate, whence he removed to New York in 1800. On his arrival he was immediately admitted to the freedom of the city, and then elected a member of the State legislature. Before his departure from Virginia he granted emancipation to his slaves, accompanying their manumission with a provision for those who needed assistance. He died April 10, 1806.

GATESHEAD, a municipal and parliamentary borough and market-town of England, county of Durham, is situated on the right bank of the Tyne, opposite Newcastle, of which it practically forms a part, being united with it by three bridges.

GATH, one of the five chief cities of the Philistines. Its site appears to have been known in the fourth century, but the name is now lost.

GATTY, MRS. ALFRED, daughter of the Rev. Dr. Scott, chaplain to Lord Nelson, was born at Burnham, Essex, in 1809. In 1839 Margaret Scott was married to the Rev. Alfred Gatty, D.D., vicar of Ecclesfield near Sheffield, sub-dean of York cathedral, and the author of various works both secular and religious. In 1842 she published in association with her husband a life of her father, the Rev. Dr. Scott; but her first independent work was *The Fairy Godmother and other Tales*, which appeared in 1851. This was followed in 1855 by the first of five volumes of *Parables from Nature*, the last being published in 1871. She died October 3, 1873.

GAUDEN, JOHN, the reputed author of the *Eikon Basilike*, was born in 1605 at Mayfield in Essex, of which parish his father was vicar. Between 1642, the date of his first printed work, and 1660 he published some thirteen or more books, of which number, however, only one appeared prior to the execution of the king. Soon after his appointment to the see of Exeter, he privately laid claim to the authorship of the *Eikon Basilike*, a work commonly attributed at the time to Charles I. This claim Gauden put forth in a correspondence with the Lord Chancellor Hyde, earl of Clarendon, and the earl of Bristol, from December 21,

1660, to March 31, 1662. The letters of Gauden among them have been published in Doctor Maty's *Review* in 1782, and again in the Appendix to vol. iii. of the *Clarendon Papers*. In 1662, on the death of Brian Duppa, bishop of Winchester, Doctor Gauden applied to be translated from Exeter to that see, but his claims were set aside in favor of George Morley, bishop of Worcester, and the vacancy thus created was filled by the bishop of Exeter. He only lived four months after this last promotion, and dying on September 20, 1662, was buried in Worcester Cathedral. His will is preserved in the Prerogative Office of Canterbury.

GAUDICHAUD-BEAUPRÉ, CHARLES, a French botanist, was born at Angoulême, September 4, 1789. He studied pharmacy first in the shop of a brother-in-law at Cognac, and then under Professor Robiquet at Paris, where, from Desfontaines and L. C. Richard, he acquired a knowledge of botany. In April, 1810, he was appointed dispenser in the military marine, and from July 1811 to the end of 1814 he served at Antwerp. In September 1817 he joined the corvette *Uranie*, as pharmaceutical botanist to the circumpolar expedition commanded by De Freycinet. The wreck of the vessel on the Falkland Isles, at the close of the year 1819, deprived him of more than half the botanical collections he had made in various parts of the world. In 1830–33 he visited Chili, Peru, and Brazil, and in 1836–37 he acted as botanist to *La Bonite* during its circumnavigation of the globe. His theory accounting for the growth of plants by the supposed coalescence of the elementary "phytons" involved him, during the latter years of his life, in much controversy with his fellow-botanists, more especially M. de Mirbel. He died January 16, 1854.

GAUERMANN, FRIEDRICH, an Austrian painter, son of the landscape painter Jacob Gauermann (1773–1843), was born at Wiesenbach near Gutenstein, in Lower Austria, September 20, 1807. Two animal pieces which he exhibited at the Vienna Exhibition of 1824 were regarded as remarkable productions for his years, and led to his receiving commissions in 1825 and 1826 from Prince Metternich and Caraman, the French ambassador. His reputation was greatly increased by his picture *The Storm*, exhibited in 1829, and from that time his works were much sought after, and obtained correspondingly high prices. His *Field Laborer* was regarded by many as the most noteworthy picture in the Vienna exhibition of 1834, and his numerous animal pieces have entitled him to a place in the first rank of painters of that class of subjects. The peculiarity of his pictures is the representation of human and animal figures in connection with appropriate landscapes and in characteristic situations, so as to manifest nature as a living whole, and he particularly excels in depicting the free life of animals in wild mountain scenery. Along with great mastery of the technicalities of his art, his works exhibit patient and keen observation, free and correct handling of details, and bold and clear coloring. He died at Vienna, July 7, 1862.

GAUGE, in the mechanical arts, is the name applied to a great variety of instruments, of which the object may be broadly stated to be the affording of increased facilities for comparing any two dimensions or distances. Wherever it is necessary for this to be done with a degree of accuracy unattainable by such means as the ordinary measuring rule affords, or for the same dimensions to be frequently measured with a maximum of speed and certainty, there will the hand-craftsman at once avail himself of some form of gauge. At the present day a due appreciation of the value of gauges is of growing importance to the mechanic, since they enable him greatly to improve the "fit" of the several portions of



his machinery, while at the same time the labor expended in fitting is materially reduced. Indeed, the system of making all similar parts "to gauge," so that in any number of machines they are interchangeable, is now effecting more than any other single cause for the improvement and cheapening of mechanical substitutes for manual labor.

GAUHÁTI, a town in Kámrúp, district Assam, the chief town of the province, situated on the left or south bank of the Brahmaputra, which is the most populous town in the Brahmaputra valley, was the seat of the British administration of Assam up to 1874, when the headquarters were removed to Shillong in the Khási hills, sixty-seven miles distant, with which it is connected by an excellent cart road.

GAUL, the name given by the Romans to the country lying between the Rhine and the Pyrenees. When the Greeks first became acquainted with the southwest of Europe they applied to the whole of it, in a somewhat vague sense, the term Celtic, calling its inhabitants Celts. Later we find Galatia and Gallia, with the corresponding Galati and Galli, used as nearly synonymous with the earlier name. The shorter of these two forms the Romans adopted; and in the opening chapter of Cæsar's well-known *Commentaries*, we have our first definite account of the limits of the country and its divisions, as then understood. According to this authority, Gaul was in his day divided among three peoples, more or less distinct from one another, the Aquitani, the Gauls, who called themselves Celts, and the Belgæ. The first of these extended from the Pyrenees to the Garumna (Garonne); the second from that river to the Sequana (Seine) and its tributary the Matrona (Marne), reaching eastward presumably as far as the Rhenus (Rhine); and the third from this bounding line to the mouth of the last-named river, thus bordering on the Germans. By implication Cæsar recognizes a fourth division, the Provincia, lying to the south in the basin of the Rhodanus (Rhône), and stretching westward as far as Tolosa (Toulouse), in the basin of the Garonne—a portion of Gaul that had been subdued and made a Roman province about fifty years before Cæsar entered on his career of conquest there. By far the greater part of the country was a plain watered by numerous rivers, the chief of which have already been mentioned, with the exception of its great central stream, the Liger or Ligeris (Loire). Its principal mountain ranges were Cebenna or Gebenna (Cevennes) in the south, and Jura, with its continuation Vosegus or Vogesus (Vosges), in the east. The tribes inhabiting Gaul in Cæsar's time, and belonging to one or other of the three races distinguished by him, were numerous. Prominent among them, and dwelling in the division occupied by the Celts, were the Helvetii, the Sequani, and the Ædui, in the basins of the Rhodanus and its tributary the Arar (Saône), who, he says, were reckoned the three most powerful nations in all Gaul; the Arverni in the mountains of Cebenna; the Senones and Carnutes in the basin of the Liger; the Veneti and other Armorican tribes between the mouths of the Liger and Sequana. The Nervii, Bellovaci, Suessiones, Remi, Morini, Menapii, and Aduatici were Belgic tribes; the Tarbelli and others were Aquitani; while the Allobroges inhabited the north of the Provincia, having been conquered in 121 B.C.

The ethnological relations of Cæsar's three great Gallic races have given rise to much discussion. Greek writers, who, in consequence of the planting of the colony of Massilia (Marseilles) on its southern coast at so early a period as 600 B.C., had gained some knowledge of Gaul before the Romans, speak of its inhabitants as Ligurians; and it is certain that a people of this name occupied at one time the coast-line of Europe from the

western slopes of the maritime Alps to the Rhone. By many these Ligurians are regarded as having once spread themselves over a much wider area, peopling extensive tracts of Europe as well as Northern Africa. Subsequently, another race, coming probably across the Pyrenees from Spain, subdued southwestern Gaul, and ruled as far north as the Garonne—the Basques of the two slopes of these mountains, remaining to our own day their lineal representatives. Later still, but a date which history does not venture to fix, one of those great waves of population that are believed to have rolled in succession from east to west brought into northern and central Gaul, it may be at an interval of centuries, the two great branches of the Celtic race, the Gadhelic or Gaelic, and the Cymric—the one represented in Britain by the Irish and Scottish Highlanders, and the other by the Welsh. Reading Cæsar's brief statements by the light thus afforded, ethnologists now generally hold that his Aquitani were Iberians, largely intermingled with intrusive Gauls; that his Gauls belonged to the Gaelic division of the Celtic race, and his Belgæ to the Cymric (both of them, however, being affected by the presence of races whose territory they had overrun, and the latter by the addition of a German element derived from their proximity to the Rhine); and that the natives of the Provincia were Ligurians, with so large an intermixture of Celts as to make the latter the dominant race. Neither the Greek colony of Massilia, nor those colonies sent out by it, can be supposed to have seriously affected the Gaulish nation from the point of view we are now discussing. It was in a different manner, as a civilizing agency, that they made their presence felt.

Such, it would appear, was Gaul ethnologically when made a part of the Roman empire by Julius Cæsar shortly before the commencement of the Christian era; and, as has often been remarked, such in the main it is still. Some recent scientific inquirers find grounds, however, for concluding that the opinion, so prevalent not only in England but in France itself, that the physical and mental characteristics of the modern Frenchman are chiefly derived from the ancient Gauls, is only in part well founded. The Gauls, they say, like the Romans after them, were strong enough to impose their language on a race or races they had subjugated; but in the attempt to absorb them they themselves have suffered and continue to suffer so much that the day may yet come when the older race will all but regain its superiority. Slowly but surely, according to the researches of M. Roget, Baron de Belloguet, the blue-eyed, fair-haired, long-headed Celt has for many generations been giving place throughout France, in a direction proceeding from south to north, to a more ancient, dark-eyed, black-haired, round-headed man—a similar phenomenon being also noticeable among the Germans.

Northern Italy, in consequence of an intrusion of Gauls at some early date, received from the Romans the name of Gallia Cisalpina or Citerior, to distinguish it from Gaul proper, called also Gallia Transalpina or Ulterior. Afterward when the Roman element gained the upper hand, Togata was sometimes substituted for Cisalpina; while in contradistinction, Gallia Braccata was applied to the Provincia from the *braccæ* or trousers worn by the natives, and Gallia Comata to the rest of the country, from the inhabitants wearing their hair long. The Gaulish emigrations into Spain on the one hand, and into Britain on the other, scarcely come under the present article; still less can we refer here to the inroads of that restless race into various parts of eastern Europe and western Asia. But it may be remarked in passing that so extensive were the conquests of the Gauls that, in the beginning of the third century before our era, their empire, if much less compact, was



scarcely less extensive than that of Rome in her palmiest days.

For some time after the death of Cæsar little attention could be paid to Gaul by the ruling powers of Rome; but in 27 B.C. Augustus, now master of the Roman world, took measures to Romanize it thoroughly. The old division into four provinces was retained, and made subservient to administrative purposes. The Provincia, however, received the name of Gallia Narbonnensis, from the Roman town of Narbo (Narbonne); the boundaries of Aquitania were extended to the Liger; what remained of Cæsar's Gauls were constituted the province of Gallia Lugdunensis, so named from its capital the new settlement of Lugdunum (Lyons); and the northern division was called Gallia Belgica. This arrangement remained nearly unchanged till the fourth century, when the four provinces were broken up into seventeen, each with a capital and a number of other towns of more or less importance, the names of which may be found in the large geographical and historical works that treat of the period. While an integral part of the Roman empire Gaul often played no mean part in the contests that took place for the imperial purple; and it was during one of these that Claudius Civilis, a Romanized Gaul, made a gallant attempt to achieve the independence of his country. His efforts, however, were not supported by the mass of the people, and the movement was crushed by Vespasian. Perhaps the most noteworthy event of those centuries was the insurrection of the Bagaudæ or peasant banditti, in the reign of Diocletian. Ruined and driven to despair by the exactions of the imperial treasury, men scoured the country in marauding bands, plundering wholesale. Though the revolt was suppressed, the lesson it ought to have taught Rome was unheeded, and thus the seeds of future troubles remained in the soil. In the declining days of the empire Gaul became a prey to the Visigoths in the south, the Burgundians in the east, and the Franks in the northeast. Order being restored, the country took a more prominent place in the political system of Europe.

GAULT, a member of the cretaceous formation, separating the lower from the upper green-sand. It consists of an upper part, hard and sandy, has green particles scattered through it; and of a lower portion, a stiff dark gray, blue or brown clay, smooth and uniform in texture and very plastic, which is manufactured into tiles, bricks, and even common pottery.

GAUNT, JOHN OF. See LANCASTER, DUKE OF.

GAUR, or, more commonly, GOUR, the name of a mediæval city in Bengal, of which the scattered relics cover a large area in the district of Malda, commencing not far south of the modern civil station of that name.

GAUSS, CARL FRIEDRICH, an eminent German mathematician, was born of humble parents at Brunswick, April 23, 1777, and was indebted for a liberal education to the notice which his talents procured him from the reigning duke. His name became widely known by the publication, in his twenty-fifth year (1801), of the *Disquisitiones Arithmeticæ*. In 1809 he published at Hamburg his *Theoria Motus Corporum Cælestium*, a work which gave a powerful impulse to the true methods of observation. With Weber's assistance he erected in 1833 at Göttingen a magnetic observatory free from iron, where he made magnetic observations, and from this same observatory he sent telegraphic signals to the neighboring town, thus showing the practicability of an electromagnetic telegraph. He further instituted an association, composed at first almost entirely of Germans, whose continuous observations on fixed term-days extended from Holland to Sicily. The volumes of their publication, *Resultate aus der Beobachtungen de Magnetischen Vereins*, extend from 1836 to 1839; and in

those for 1838 and 1839 are contained the two important memoirs by Gauss, *Allgemeine Theorie der Erdmagnetismus*, and the *Allgemeine Lehrsätze*—on the theory of forces attracting according to the inverse square of the distance. The instruments and methods thus due to him are substantially those employed in the magnetic observatories throughout the world. He died at Göttingen early in the spring of 1855. The centenary of his birth was celebrated (1877) at his native place, Brunswick.

GAUSSEN, FRANÇOIS SAMUEL ROBERT LOUIS, a Protestant theological writer of some repute, was born at Geneva on August 25, 1790, and died in 1833.

GAUTIER, THÉOPHILE, was born at Tarbes in the year 1811. He was educated at the grammar school of that town, and afterward at the Collège Charlemagne in Paris, where it does not appear that he particularly distinguished himself, though in later life his remarkable literary faculty and instinct enabled him to give to much of his work an air of scholarship and almost of erudition. He very early devoted himself to the study of the older French literature, especially that of the sixteenth and the early part of the seventeenth century. This study qualified him well to take part in the romantic movement, and enabled him to astonish Sainte-Beuve by the phraseology and style of some literary essays which, when barely eighteen years old, he put into the great critic's hands. He began (like Thackeray, to whom he presents in other ways some striking points of resemblance) as an artist, but soon found that his true powers lay in another direction. His first considerable poem, *Albertus* (1830), displayed a good deal of the extravagant character which accompanied rather than marked the movement, but also gave evidence of uncommon command of both language and imagery, and in particular of a descriptive power hardly to be excelled. The promise thus given was more than fulfilled in his subsequent poetry. But it was not, after all, as a poet that Gautier was to achieve either profit or fame. Thrown as he was into circles which were nothing if not literary, it was natural that he should attempt all literary forms, and certain, considering his powers, that he should be successful in all. For the theater, however, he had but little gift, and his dramatic efforts (if we can except certain masques or ballets in which his exuberant and graceful fancy came into play) are by far his weakest. For a time he acted as secretary to Balzac, but found this occupation uncongenial enough, though it left some traces in his independent work. His first novel of any size, and in many respects his most remarkable work, was *Mademoiselle de Maupin* (1835). During the years from 1833 onward, his fertility in novels and tales was very great.

It was, however, neither in poems nor in novels that the main occupation of Gautier as a literary man consisted. He was early drawn to the more lucrative task of feuilleton writing, and for more than thirty years he was among the most expert and successful practitioners of this art. He died in October, 1872.

GAUZE, a light, transparent, silken fabric, woven in an open manner with very fine yarn. It is said to have been originally made at Gaza in Palestine, whence the name. In the weaving of gauze the warp threads, in addition to being crossed as in plain weaving, are twisted in pairs from left to right and from right to left alternately, after each shot of weft, thereby keeping the weft threads at equal distances apart, and retaining them in their parallel position. The textures are woven either plain, striped, or figured; and the material receives many designations, according to its appearance and the purposes to which it is devoted.

GAVARNI, French caricaturist, was born at Paris in



1801, and died in 1866. His true name was Chevalier (Sulpice Guillaume), and he is said to have taken the *nom de plume* under which he is known from the place where he made his first published sketch. His name was exceedingly popular, and his illustrations for books were eagerly sought for by publishers. A single frontispiece or vignette was sometimes enough to secure the sale of a new book. Gavarni was much engaged, during the last period of his life, in scientific pursuits, and this fact must perhaps be connected with the great change which then took place in his manner as an artist. He sent several communications to the Académie des Sciences, and till his death, which happened on November 23, 1866, he was eagerly interested in the question of aerial navigation. It is said that he made experiments on a large scale with a view to find the means of directing balloons; but it seems that he was not so successful in this line as his fellow-artist, the caricaturist and photographer, Nadar.

GAVIAL. See CROCODILE.

GAY, JOHN, one of the most eminent of the secondary English poets, was a native of Devonshire, born in 1688 at Frithelstock, near Torrington, where his family had been long settled. His father dying when the future poet was only about six years of age, and leaving four children, the prospects of the family were unpromising; and John, after receiving his education at the grammar school of Barnstaple, was put apprentice to a silk mercer in London. He disliked the employment, obtained his discharge, and embarked in a literary life, varied only by incessant efforts to obtain the patronage of the great. Gay's ambition was limited to a life of ease, fine-dressing, and a luxurious table, in all of which he had marvelous success, but little contentment. In the years 1713 and 1714, besides the *Rural Sports*, he produced a comedy, *The Wife of Bath*, which was acted only three nights; *The Fan*, a poem; and *The Shepherd's Week*, a series of six pastorals drawn from English rustic life. In this fortunate year Gay was appointed secretary to the Earl of Clarendon, ambassador to the court of Hanover; but the death of Queen Anne, August 1, 1714, soon put an end to his hopes of permanent official employment. He then tried the drama, and produced his farce of *What d'ye Call it?* which was acted with little success in February 1714-15. In 1716 appeared his *Trivia, or the Art of Walking the Streets of London*, a poem in three books for which he acknowledged having received several hints from Swift. It is an excellent *town* poem, containing graphic and humorous descriptions of the London of that period. In January, 1716-17, the comedy of *Three Hours after Marriage* was brought on the stage, and emphatically condemned. In this piece Gay was assisted by Pope and Arbuthnot. Pope is distinctly visible in his allusions to Dennis the critic, and it is remarkable that three such men should have produced a play so dull, unnatural, and gross. Gay was taken to Aix by Mr. Pulteney in 1717. By the beginning of 1724 he had a new play ready, a tragedy called the *Captives*, which was patronized by the Princess (afterward Queen) Caroline and the Prince of Wales. In 1726 he published his famous *Fifty-one Fables in Verse*. His next work was the *Beggar's Opera*, performed in 1727, written in ridicule of the Italian Opera, which for a time it drove off the English stage. The poet died, after a short illness, December 4, 1732, and the duke and duchess of Queensbury honored his remains with a splendid funeral and monument in Westminster Abbey.

GAY, MARIE FRANÇOISE SOPHIE, MADAME, daughter of M. Nichault de Lavalette (who was attached to the household of Monsieur, afterward Louis XVIII.),

and of Francesca Peretti, a Florentine lady, was born at Paris July 1, 1776. Her first literary production was a letter written in 1802 to the *Journal de Paris*, in defense of Madame de Stael's novel *Delphin*; and in the same year she published anonymously her first novel *Laure d'Estell. Léonie de Montbreuse*, which appeared in 1813, is considered by Sainte-Beuve her best work; but *Anatolie*, which appeared in 1815, has perhaps a higher reputation. These and several of her other works, amongst which may be specially named *Les Salons célèbres*, possesses an interest beyond their intrinsic merits—chief of which are purity and elegance of style—for their portraiture of French society especially during the period of the directory and the consulate, and of many of the distinguished personages whose intimacy she enjoyed. Madame Gay wrote several theatrical pieces which had considerable success. She was also an accomplished player on the pianoforte and harp, and composed both the words and music of a number of *romances*. She died in 1852.

GAYÁ, a district of British India in the Pantá division, under the lieutenant-governor of Bengal.

GAYÁ, the chief town and administrative headquarters of the above district, situated on the bank of the Phálgú river.

GAY-LUSSAC, JOSEPH LOUIS, one of the most distinguished of modern physicists and chemists, was born at St. Léonard, in the department of Haute Vienne, on December 6, 1778. Intended for the bar, young Gay-Lussac prosecuted his early studies in Latin and other elementary subjects at home, under the superintendence of the Abbé Bourdeix and other masters until 1794, when he was sent to Paris, where he worked very hard for three years preparing for admission to the École Polytechnique. After a brilliant examination he was received into this institution on December 27, 1797, whence on November 22, 1800 he was transferred to the school Des Ponts et Chaussées. Shortly afterward he was assigned to Berthollet, who had returned from Napoleon's Egyptian expedition, and who was desirous of having an able student from the École Polytechnique to aid him in his researches. The results expected by the author of the *Statique Chimique* were not verified by his assistant's experiments, which seem to have been recorded without any consideration of the theorizer's feelings. It was on this occasion, according to Arago, that Berthollet, at first nettled to find that his ideas were not confirmed, delivered himself as follows: "Young man, it is your destiny to make discoveries. You shall be henceforth my companion. I wish—it is a title of which I am sure I shall have cause some day to be proud—I wish to be your father in science."

Gay-Lussac accordingly entered on a long series of researches upon certain physical phenomena, which though of constant recurrence in experimental inquiries, had up this time been very imperfectly examined. In his first memoir he shows that different gases are dilated in the same proportion when heated from 0° to 80° (Réaumur). The investigations recorded in this memoir were followed by experiments on the improvements of thermometers and barometers, on the tension of vapors, their mixture with gases, and the determination of their density, evaporation, hygrometry, and capillarity. In course of these researches, which engaged him for a couple of years, he acquired not only dexterity in manipulation and the contrivance of experiments, but a great deal of valuable knowledge of physics. During the interval, in the year 1802, he had been nominated Fourcroy's demonstrator at the École Polytechnique, and as he had in this capacity to lecture frequently for the professor, he was beginning to acquire reputation as a teacher and expounder of chemistry and physics, by



the clearness, precision, and care which his lectures evinced. In 1803-4 certain results respecting terrestrial magnetism had been obtained during two balloon ascents, which appeared of such interest that the French Academy was desirous of having them repeated. Through Berthollet and Chaptal the balloon which had been used in Egypt was obtained, and fitted up with various instruments; the observations were intrusted to Gay-Lussac and Biot, who made their first ascent from the garden of the Conservatoire des Arts et Metiers, on August 24, 1804. In this ascent an altitude of 4,000 meters was attained, but unexpected difficulties were encountered, and the results were not decisive. Not satisfied with the expedition, Gay-Lussac got a larger balloon provided with every requisite, and made an ascent by himself on September 16th of the same year. On this occasion the balloon rose to a height of 7,016 meters, an altitude greater than any which had been formerly reached, and surpassed only by a few later ascents. At this great elevation of nearly 23,000 feet, and with the thermometer at  $9\frac{1}{2}^{\circ}$  C. below freezing, Gay-Lussac remained for a considerable time making observations on temperature, on the moisture of the air, on magnetism, and other points. He observed particularly that he had considerable difficulty in breathing, that his pulse was quickened, and that by the absence of moisture in the air his mouth and throat became so parched that it was painful to swallow even a piece of bread. The experiments on magnetism for which the ascent was primarily made were imperfect, but they led him to the conclusion that the magnetic effect at all attainable elevations above the earth's surface remains constant. Having collected samples of air at different elevations he, on his return to Paris, proceeded to analyze them, and in conjunction with Alexander von Humboldt, whom he had associated with himself in this investigation, he published several papers on eudiometric analysis and related topics. The memoir, which was read to the Institute on October 1, 1804, contained the germ of what was afterward Gay-Lussac's most important generalization. The authors observed that when oxygen and hydrogen combine together by volume, it is in the proportion of one volume of the former to two volumes of the latter. Prior to this the numerous experiments on the volume composition of water had always brought out various complicated ratios, though approaching the simple one more or less closely. It was not, however, till 1808, that Gay-Lussac announced the law of combination by volume in its general form. Shortly after these investigations were completed, Gay-Lussac got leave of absence to accompany Von Humboldt on a scientific journey to Switzerland, Italy and Germany. Provided with physical and meteorological instruments, they left Paris March 12, 1805, and traveled by Lyons, Chambery and Mont Cenis to Genoa, and thence to Rome, where they arrived July 5th. After a short stay at Rome in the residence of William von Humboldt, during which Gay-Lussac made a few chemical analyses, they departed for Naples in company with Leopold von Buch, afterward so eminent as a geologist. During his visit Gay-Lussac had the opportunity of studying on the spot volcanic eruptions and earthquakes. Vesuvius, which was in violent action, he ascended six times. After this the party went back to Rome, and then started for Florence on September 17, 1805. A few days having been spent there, they went on to Bologna and thence to Milan, which they reached on October 1st, and there they had the pleasure of meeting Volta. The party crossed the St. Gotthard on October 14-15, in the midst of a storm which prevented their seeing anything, and after some delay reached Göttingen, where they were received with much attention by Blu-

menbach, the famous naturalist. On November 16th they arrived in Berlin, where the winter and the following spring were spent. In this way Gay-Lussac became acquainted with the best society in Berlin, and was especially intimate with Klaproth and Erman. In spring he hurriedly returned to Paris. The death of an Academician had left a vacant place, and he was hopeful that he might be elected to fill it. Arago remarks that it is curious that Gay-Lussac should have found it necessary to be on the spot to insure success. What he had already done for science might have been considered sufficient, apart from personal considerations, but there were prejudices which might have acted unfavorably, if he had not been present to meet them. These were, however, successfully overcome, and he entered the Academy in 1806. In the following year was inaugurated the Société d'Arcueil, a small group of scientific men who used to assemble at Berthollet's house. Gay-Lussac was an original member of the society, which is of interest chiefly on account of its having been the means of publishing some papers which have since proved of great historical interest. The results of his magnetic observations made along with Humboldt were published in vol. i. of its *Mémoires* (1807); and vol. ii. (1809) contains the important memoir on gaseous combination, in which he pointed out that, when gases combine with one another by volume or by measure, they do so in the very simplest proportions, 1 to 1, 1 to 2, 2 to 3, and so on, and that the volume of the product in the gaseous state bears a very simple ratio to that of the constituents. This law, which, along with Humboldt, he had shown to be true of water, he extended to several other gases, and he even deduced from the vapor density of compounds that of certain elements, more particularly carbon, mercury and iodine, which had not been ascertained by direct experiment.

The next events in Gay-Lussac's scientific career are connected with what may be called his rivalry with Davy, who in matter of age (b. December 17, 1778) was almost exactly his contemporary. In 1808 when Davy, having isolated potassium and sodium, was awarded Napoleon's prize for the most important discovery in voltaic electricity, the emperor is said to have asked how it was that these discoveries were made abroad and French prizes were carried away. Having been informed that there was no battery of power equal to that used by Davy, he caused a very large one to be made, and presented to the École Polytechnique. While waiting for it, Gay-Lussac and Thénard succeeded in preparing potassium by a direct chemical action, in which fused potash was brought in contact with red-hot iron. This method enabled chemists to prepare the alkali metals in quantity, and Gay-Lussac and Thénard availed themselves of it to examine the properties of potassium very completely, and not only so, but also to use it as a means of decomposing other substances. It was in this way that they separated boron from boracic acid, an element which was also prepared by Davy with the same materials. It is worth notice that Davy admitted the advantage of the method of Gay-Lussac and Thénard, though he seems to have subsequently regarded their appropriation of the newly-discovered metal as not altogether warranted. The researches with the great battery after it was made did not come up to their expectations; the power fell far short of what had been anticipated, and they confined themselves rather to an examination of the phenomena presented by the apparatus itself, than to using it as an engine for effecting important decompositions.

In 1809 was published the second investigation parallel to one by Davy, namely, upon hydrochloric (or, as it was then called, muriatic) acid, and chlorine, then



called oxymuriatic acid. This memoir was read to the Institute, and was also published in the second volume of the *Mémoires d'Arcueil*.

Among the investigations which Gay-Lussac undertook with Thénard in the years 1810-1811, and which ultimately yielded most valuable results, must be mentioned those upon organic chemistry, and especially upon the analysis of fixed organic compounds. Before this time the only way of determining the composition of organic substances was to explode them with oxygen, and as this method was practicable only in the case of bodies which were gaseous, or could be readily volatilized, the great majority of fixed organic substances still remained unexamined. Gay-Lussac and Thénard introduced the plan of adding some oxidizing agent to the substance and burning it in a tube. They used chlorate of potassium, and the products of combustion were collected over mercury. The results obtained were in some cases very accurate, but the process was difficult of execution, and it is singular that the authors should have preferred it to the combustion with oxide of copper, which they also tried. In 1815, however, Gay-Lussac employed the latter agent for the examination of cyanogen, and the other method was abandoned. The final improvements were made some years later by Liebig, when working in Gay-Lussac's laboratory. By their original method Gay-Lussac and Thénard determined the composition of fifteen organic substances, including sugar, starch, gum, wax, oil, various woods, resin; mucic, oxalic, tartaric, citric and acetic acids; and albumen, fibrin, gelatin and casein. Gay-Lussac succeeded also, in 1811, in obtaining pure hydrocyanic acid. He described its physical properties, but did not announce anything about its composition till 1815, when he published his celebrated memoir in which he described cyanogen as a compound radical, prussic acid as a compound of this radical with hydrogen alone, and the prussiates as compounds of the radical with metals. He also showed how to prepare free cyanogen, and explained Berthollet's oxyprussic acid to be really chloride of cyanogen. The proof that prussic acid contains hydrogen and no oxygen was a most important support to the hydrogen acid theory, while the isolation of the radical cyanogen was of equal importance for the subsequent epoch of compound radicals in organic chemistry.

In 1813-14 Gay-Lussac published his memoirs on iodine. This was the third investigation which involved a rivalry with Davy, and it was also that about which there was most feeling. Courtois had discovered the substance in 1811, and had given some of it for examination to Clément-Désormes. He had only published a brief notice of it when Davy arrived in Paris, having obtained express permission of Napoleon to pass through France on his way to Italy. Davy got a few fragments of this curious substance, and after a brief examination with a very limited portable laboratory which he had with him, perceived its analogy to chlorine, and drew the conclusion that it must be a simple body of similar character. Gay-Lussac, it is said, having heard of Davy's making experiments with it, went off to Courtois, got a specimen, and proceeded to examine it. He also saw its likeness to chlorine, but his previous decision respecting that body hampered him, and it was with some hesitation that he ultimately acknowledged its elemental character. Whether or not Gay-Lussac was actuated by the motive ascribed to him by Arago—that it would be a reflection on French science were the settlement of the characters of this substance to be left to a foreigner visiting Paris—it is not necessary to inquire; but Davy seems to have felt that Gay-Lussac was competing, and not altogether fairly, with him. In

a letter to Clément he gives a brief account of his work, and lays claim to the first revelation of the elemental character of iodine, and again in a subsequent letter to his brother, which contains a short review of the Parisian chemists and their reception of him, the only complaint he makes is that Gay-Lussac had played him a trick in trying to appropriate the discovery of the character of iodine and of hydriodic acid. Quite apart, however, from this claim on Gay-Lussac's part, the memoirs remain models of investigation and description. Davy quite freely admitted that full light might be expected on the subject from its having been taken in hand by so able and accurate a chemist as Gay-Lussac.

The year 1815 saw the completion of the research on cyanogen already referred to, and with it concludes the period of Gay-Lussac's most important discoveries. Having now attained a leading if not the foremost place among the scientific men in the French capital, his advice was often required on important questions. His attention was thus turned in part from purely scientific subjects to points of practical interest. In these new fields, however, he displayed the same powers which he had exercised so sedulously in the pursuit of scientific truth; in fact he was now to introduce and establish scientific accuracy where there had been previously only practical approximations. The most important of these later discoveries were the method of estimating the amount of real alkali in potash and soda by the volume of standard acid required for neutralization; the method of estimating the amount of available chlorine in bleaching powder by a solution of arsenious acid; directions for the use of the centesimal alcoholometer, published in 1824, and specially commended by the commission of the Institute appointed to report on it, as displaying all the accuracy and exhaustive treatment of the author; and lastly, the perfecting of the method of assaying silver by a standard solution of common salt, a volume on which was published in 1833. This last has superseded the old method of assaying silver by cupellation, as being more rapid, more accurate, and easier of execution; and indeed all these processes are so complete and satisfactory, and are besides so identified with their author's name, that his reputation is secured by them, quite independently of his earlier work. In what has been said above, only the more important of Gay-Lussac's discoveries have been alluded to. To enter into an account, however brief, of all his labors, would occupy more space than can be allowed here. Indeed the list of his papers in the Royal Society's catalogue amounts to 148, besides those of which he was joint-author with Von Humboldt, Thénard, Welter, and Liebig; and they embrace every department of the science as cultivated fifty years ago. Among his later researches may be mentioned those on fermentation, and those executed by Liebig in conjunction with him, after the young German chemist had gained the coveted admission to Gay-Lussac's private laboratory during the years 1823-24. The latter include improvements on organic analysis, and the examination of fulminic acid. Gay-Lussac continued his work, and published the results in the *Annales de Chimie*, of which he had been joint-editor for some thirty years, up till almost his death, which took place at Paris on May 9, 1850.

GAZA, an ancient city of Philistia, close to the sea and to the south boundary of the Holy Land.

GAZA, THEODORUS, one of the leaders of the revival of learning in the fifteenth century, was born at Thessalonica about the year 1400. About 1440 he became professor of Greek in the newly founded university of Ferrara, to which students in great numbers from all parts of Italy were soon attracted by his fame as a teacher. From 1456 to 1458 he lived at Naples under



the patronage of Alphonso the Magnanimous; and shortly after the latter date he was appointed by Cardinal Bessarion to a benefice in the south of Italy, where the latter years of his life were spent, and where he died at an advanced age in 1478.

GAZELLE is a name given to some twenty different species of antelopes, which differ from each other principally in the form of curvature of the horns, in the female, and in the color. The true gazelle (*Gazella Dorcas*) is a species about the size of a roebuck, but of lighter and more graceful form, with longer and more slender limbs, in these respects exhibiting the typical characters of the antelopes in their highest perfection. It is of a light tawny color, the under parts white; a broad brown band along each flank; the hair short and smooth. The face is reddish fawn-color, with white and dark stripes. The horns of the old males are nine or ten inches long, bending outward and then inward, like the sides of a lyre, also backward at the base and forward at the tips, tapering to a point, surrounded by thirteen or fourteen permanent rings, the rings near the base being closest together and most perfect. The horns of the female are smaller and obscurely ringed. The ears are long, narrow, pointed; the eyes very large, soft, and black; there is a tuft of hair on each knee; the tail is short, with black hairs on its upper surface only, and at its tip. The gazelle is a native of the north of Africa, and of Syria, Arabia, and Persia. Great herds of gazelles frequent the northern borders of the Sahara; and notwithstanding their great speed, and the resistance which they are capable of making when compelled to stand at bay—the herd closing together with the females and young in the center, and the males presenting their horns all around—lions and panthers destroy them in great numbers.

GAZETTE, THE LONDON, is the official newspaper of the government, and is published every Tuesday and Friday. It contains proclamations, orders, regulations, and other acts of state, and is received as evidence thereof in legal proceedings. It also contains notices of proceedings in bankruptcy, dissolutions in partnerships, etc. The bankruptcy Act, 1869, requires the order of adjudication to be published in the *Gazette*, and makes the *Gazette* conclusive evidence of adjudication. Other statutes, dealing with other subjects, have similar provisions. Unless by virtue of such statutes, the *Gazette* is not evidence of anything but acts of state. The Scotch law of evidence would appear to be not so stringent. Gazettes are also published in Edinburgh and Dublin.

GEBAK PALM (*Corypha gebanga*), a fan-leaved palm, native of the East Indies, and one of the most useful palms of that part of the world. Its stem yields a kind of sago; its root is medicinal, being both emollient and slightly astringent, so as to be particularly adapted to many cases of diarrhoea; its leaves are used for thatch, for making hats, and for various economical purposes; its young leaves are plaited into baskets and bags, in the manufacture of which many of the people of Java find much employment; the fibers of its leaf-stalks are made into ropes, baskets, nets, cloth, etc. To the genus *Corypha* belongs also the talipat palm. The fruit of *C. pumas*, a Mexican species, is eatable.

GEBER. It seems to be pretty generally believed that the Geber of Western Europe is the same as the person who is called in full Abu Musa Dschabir (or Jabir) Ben Haijan Ben Abdallah el-Sufi el-Tarsusi el-Kufi, who was reckoned the most illustrious of the alchemists by the Arabs, and who is mentioned in the *Kibab al-Fihrist* (tenth century) by Ibn Khallikan (thirteenth century), by Haji Khalfa (seventeenth century) and other writers. If this be correct, Geber must

have flourished in the eighth century, for according to Haji Khalfa, Dschabir Ben Haijan died in the 160th year of the Hegira, which corresponds with the year beginning October 19, 776 A.D. His birthplace was Tarsus, or, as others say, Kufa; and he is said to have resided at Damascus and Kufa. Other writers have tried to show that Geber was a native of Spain, or at least lived at Seville, but this has probably arisen from confusing Geber, the chemist, with other persons of the same or similar name.

GEWEILER, in French *Guebwiller*, a town of the German imperial province of Alsace-Lorraine, in the district of Upper Alsace, situated about thirteen miles south of Colmar, at the mouth of the Blumenthal, or "Vale of Flowers." Population, 12,000.

GECKO, the common name applied to all the species of *Geckotidae*, an extensive family of lizards belonging to the Pachyglössæ, or "thick-skinned" sub-order of Gray. The geckoes are small creatures, seldom exceeding eight inches in length, including the tail. With the head considerably flattened, the body short and thick, the legs not high enough to prevent the body dragging somewhat on the ground, the eyes large and almost destitute of eyelids, and the tail short, and, in some cases, nearly as thick as the body, the geckoes, altogether, lack the litheness and grace characteristic of most lizards. The colors also are dull, and to the weird and forbidding aspect thus produced the general prejudice against those creatures in the countries where they occur, which has led to their being classed with toads and snakes, is no doubt to be attributed. Their bite was supposed to be venomous, and their saliva to produce painful cutaneous eruptions; even their touch was thought sufficient to convey a dangerous taint. It is needless to say that in this instance the popular mind was misled by appearances. The geckoes are not only harmless, but are exceedingly useful creatures, feeding on insects and worms, which, owing to the great width of the œsophagus, they are enabled to swallow whole, and in pursuit of which they do not hesitate to enter human dwellings, where they are often killed on suspicion.

GED, WILLIAM, the inventor of the art of stereotyping, was born at Edinburgh about the beginning of the eighteenth century. In 1725 he first put in practice the art which he had discovered; and some years later he entered into a partnership with a London capitalist, with a view to employing it on a great scale. The partnership, however, turned out very ill; and Ged, broken-hearted at his want of success, died at London, October 19, 1749. The only books which he produced by means of stereotyping were two prayer-books for the university at Cambridge, and an edition of Sallust.

GEDDES, ALEXANDER, a learned theologian, biblical critic, and miscellaneous writer, was born at the farm of Arradoul, in the parish of Rathven, Banffshire, Scotland, September 14, 1737. After a visit to Paris which extended over some months, and which was employed by him in reading and making extracts from rare books and manuscripts in the public libraries, he in 1769 was appointed to the charge of the Catholic congregation of Auchinhalrig in his native country. During a period of a ten years' incumbency there he displayed a liberality of spirit which caused considerable scandal to his stricter brethren; and the freedom with which he fraternized with his Protestant neighbors once and again called forth the rebuke of his bishop (Hay). Ultimately, on account of his occasional attendance at the parish church of Cullen, where his friend Buchanan was minister, he was deprived of his charge and forbidden the exercise of ecclesiastical functions within the diocese. This happened in 1779; and



in 1780 he went with his friend Lord Traquair to London, where he spent the rest of his life, with the exception of a few weeks devoted to travel on the Continent. Dr. Geddes was engaged on a critical translation of the Psalms, which he had completed down to the 118th, when he was seized with a lingering and painful illness which ultimately proved fatal on February 27, 1802.

GEELONG, one of the leading towns in Victoria, coeval with Melbourne in the history of Australian settlement, is pleasantly situated on Corio Bay, an extensive western arm of Port Philip, forty-five miles southwest of Melbourne. Population 30,000.

GEESTEMUNDE, a seaport in the Prussian province of Hanover, in the district or *Landdrostei* of Stade, situated, as the name indicates, at the mouth of the Geeste, a right-hand affluent of the estuary of the Weser. Population (1890), 12,000.

GEFLE, Latinized as *Gevalia*, a seaport town of Sweden, at the head of Gefleborglan, about a mile from the shore of the gulf of Bothnia, near the mouth of the Gefle—A, fifty miles east of Falun, and about the same distance north of Upsala. Population, 17,250.

GEHENNA is the Greek form of the Hebrew *Gehinnom* (Valley of Hinnom), or *Ge-ben-Hinnom* (Valley of the Son of Hinnom). This valley, or rather gorge—for it is described as very narrow, with steep and rocky sides—lies south and west of the city of Jerusalem. Here Solomon built a high place for Moloch (I. Kings xi, 7), and, in fact, Gehenna appears to have become a favorite spot with the later Jewish kings for the celebration of idolatrous rites. It was here that Ahaz and Manasseh made their children pass through the fire, and at the southeast extremity, specifically designated Tophet (place of burning), the practice of infant sacrifice to the fire gods was not unknown (Jeremiah vii, 31). Among the later Jews, Gehenna and Tophet came to be regarded as symbols of hell and torment, and in this sense the former word is frequently employed by our Savior in the New Testament.

GEIGER, ABRAHAM, one of the ablest leaders of the modern Jewish school of theology and criticism, was born at Frankfort-on-the-Main, May 24, 1810. In 1863 Geiger became head of a synagogue of his native town, whence he removed in 1870 to Berlin, where, in addition to his duties as chief rabbi, he took the principal charge of the newly established seminary for Jewish science. The *Urschrift* was followed by a more exhaustive handling of one of its topics in *Die Sadducäer und Pharisäer* (1863), and by a more thoroughgoing application of its leading principles in an elaborate history of Judaism (*Das Judentum u. seine Geschichte*) in 1865-71. From 1862 until his death (which occurred October 23, 1874) he was editor of a periodical entitled *Jüdische Zeitschrift für Wissenschaft und Leben*.

GEIJER, ERIK GUSTAF, Sweden's greatest historian, was born at Ransäter in Värmland, January 12, 1783, of a family that had immigrated from Austria in the time of Gustavus Adolphus. At sixteen he left Carlstad gymnasium for the University of Upsala, where in 1803 he carried off the Swedish Academy's great prize for an *Areminne öfver Riksförstandaren Sten Sture*. He graduated in 1806, and in 1810 returned from a year's residence in England to become "docent" in his university. Soon afterward he accepted a post in the public record office of Stockholm, where, with eleven friends, he founded the "Gothic Society." Geijer's lyric muse was soon after silenced by his call to be assistant to Fant, professor of history of Upsala (1815), whom he succeeded in that chair in 1817.

In 1824 he was elected to the Swedish Academy. A single volume of a great projected work, *Svea Rikes Hufvud*, itself a masterly critical examination of the sources of Sweden's legendary history, appeared in 1825. Geijer's researches in its preparation had severely strained his health, and he went the same year on a tour through Denmark and part of Germany, his impressions from which are recorded in his *Minnen* (1834). In 1832-36 he published three volumes of his *Svenska folkets historia*, a clear view of the political and social development of Sweden down to the close of Queen Christina's reign. The acute critical insight, just thought, and finished historical art of these two incomplete works of Geijer entitle him to the first place among Swedish historians. He died in 1847.

GEIKIE, WALTER, a Scotch subject-painter, was born at Edinburgh, November 9, 1795. He first exhibited in 1815, and was elected an associate of the Royal Scottish Academy in 1831, and a fellow in 1834. He died on August 1, 1837, and was interred in the Greyfriars Church, Edinburgh. Owing to his want of feeling for color, Geikie was not a successful painter in oils, but he sketched in India ink with great truth and humor the scenes and characters of Scottish lower-class life in his native city.

GEILER, or GEYLER, VON KAISERSBERG, JOHANN, one of the greatest of the popular preachers of the fifteenth century, was born at Schaffhausen, March 16, 1445. A living interest in theological subjects, which had been awakened within him by the study of Gerson, led in 1471 to his removal to the university of Basel, at that period a center of attraction to some of the most earnest spirits of the times. Made a doctor of theology in 1475, he received a professorship at Freiburg in the following year. Ultimately he accepted in 1478 a call to the cathedral of Strasburg, where he continued to work with few interruptions until within a short time of his death, which occurred on March 10, 1510.

GEISSLER, HEINRICH, a distinguished practical physicist, was born at the village of Igelshieb in Saxe-Meiningen, Germany, where he was educated as a glass-blower. After many years spent in traveling from city to city in the exercise of his craft, he settled at Bonn, where he speedily gained a high reputation, not only for his surpassing skill and ingenuity of conception in the fabrication of physical apparatus, but for his comprehensive knowledge, acquired chiefly in later life, of the natural sciences. He is best known as the inventor of the sealed glass tubes which bear his name, by means of which are exhibited the phenomena accompanying the discharge of electricity through highly rarefied vapors and gases. Among other apparatus contrived by him are his vaporimeter, mercury air pump, balances, normal thermometer, and areometer. From the university of Bonn, on the occasion of his jubilee, he received the honorary degree of doctor of philosophy. He died on January 24, 1879, in the sixty-fifth year of his age.

GELA, an ancient city on the south coast of Sicily, on a river of the same name, near the site of the modern Terranuova between Girgenti and Camerina.

GELASIUS, the name of two popes.

GELASIUS I. succeeded Felix III. in 492, and confirmed the estrangement between the Eastern and Western Churches by insisting on the removal of the name of Acacius, bishop of Constantinople, from the diptychs. He was also the first decidedly to assert the supremacy of the papal over the imperial power, and the superiority of the pope to the general councils. Gelasius died in 496, and was canonized, his day being November 18th.

GELASIUS II. (Giovanni da Gaeta) was of noble de-



cent, and was born at Gaeta about 1050. On the death of Pascal II. he was elected pope by the cardinals, January 18, 1118, and when his person was seized by Cencius Frangipani, a partisan of the emperor Henry V., he was almost immediately set at liberty through the general uprising of the people in his behalf. The sudden appearance of the emperor, however, compelled him to leave Rome for Gaeta, and the imperial party chose an anti-pope, Burdinus, archbishop of Braga, under the name of Gregory VIII. Gelasius, at a council held at Capua, fulminated bulls of excommunication against his ecclesiastical rival and the emperor; and under the protection of the Norman princes he was able to return to Rome, where he staid for a time in partial concealment, but having barely escaped capture by the Frangipani while celebrating mass in the church of St. Praxede, he left the city, and after wandering through various parts of Italy and France died in the abbey of Clugny, January 19, 1119.

**GELATIN.** When intercellular connective tissue, as met with in skin, tendons, ligaments, and the fasciæ of the muscles, of which it forms the basis, is treated with water, preferably hot, or in presence of dilute acids, for some time, a solution is obtained which in cooling solidifies to a jelly. The dissolved substance bears the name of *Gelatin* or *Glutin*.

The same substance is obtained when the matrix of bones is submitted to similar treatment, after previous removal of the lime salts by means of mineral acids. Again, when unossified cartilage, as for instance the bone-cartilages of the vertebrate fœtus, is treated with water or dilute acids, a solution is obtained which also gelatinizes on cooling. The coagulation in this case, however, is due, not to gelatin, but to a closely allied substance called chondrin.

True gelatigenous tissue occurs in all mature vertebrates, with the single exception, according to Hoppe-Seyler, of that in other respects anomalous vertebrate, *Amphioxus lanceolatus*. In the embryo it does not appear till late in fœtal life, chondrin being found instead; and the change which brings gelatin into the place of chondrin is effected, not by a metamorphosis of the latter, but by its removal, and the independent formation of gelatin. Gelatin, as such, is not met with in any of the normal fluids of the body, but occurs in the blood in cases of *leukhæmia*.

Various qualities of impure gelatin are prepared on the large scale by boiling up the hides of oxen, skins of calves, and spongy parts of horns; from any of the crude gelatins the pure substance may be obtained by bleaching with sulphurous acid and steeping repeatedly in warm water, when in the state of soft jelly.

Pure gelatin is an amorphous, brittle, nearly transparent substance, faintly yellow, tasteless, and inodorous, neutral to vegetable colors, and unaltered by exposure to dry air.

Nothing is known with any certainty as to its chemical constitution, or of the mode in which it is formed from albuminoids.

According to Wanklyn, gelatin is distinctly differentiated from such substance as *casein* and *albumin* by a marked difference in behavior when treated successively with boiling potash and alkaline permanganate.

Although gelatin in a dry state is unalterable by exposure to air, its solution exhibits, like all the proteids, a remarkable tendency to putrefaction; but a characteristic feature of this process in the case of gelatin is that the solution assumes a transient acid reaction. The ultimate products of this decomposition are the same as are produced by prolonged boiling with acid. It has been found that oxalic acid, over and above the action common to all dilute acids of preventing the solidifica-

tion of gelatin solutions, has the further property of preventing in a large measure this tendency to putrefy when the gelatin is treated with hot solutions of this acid, and then freed from adhering acid by means of carbonate of lime. Gelatin so treated has been called *metagelatin*.

Strange to say, in spite of the marked tendency of gelatin solutions to develop ferment-organisms, and undergo putrefaction, the stability of the substance in the dry state is such that it has even been used, and with some success, as a means of preserving perishable foods.

Gelatin has a marked affinity for water, abstracting it from admixture with alcohol, for example. Solid gelatin steeped for some hours in water absorbs a certain amount and swells up, in which condition a gentle heat, as that of the water-bath, serves to convert it into a liquid; or this may be readily produced by the addition of a trace of alkali or mineral acid, or by strong acetic acid. In the last case, however, or if we use the mineral acids in a more concentrated form, the solution obtained has lost its power of solidifying, though not that of acting as a glue. By prolonged boiling of strong aqueous solutions at a high, or of weak solutions at a lower temperature, the characteristic properties of gelatin are impaired and ultimately destroyed. After this treatment it acts less powerfully as a glue, loses its tendency to solidify, and becomes increasingly soluble in cold water; nevertheless the solutions yield on precipitation with alcohol a substance identical in composition with gelatin.

By prolonged boiling in contact with hydrolytic agents, such as sulphuric acid or caustic alkali, it yields quantities of *leucin* and *glycocoll* (so-called "sugar of gelatin," this being the method by which glycocoll was first prepared), but no *tyrosin*. In this last respect it agrees with its near allies, chondrin and elastin, and differs from the great body of proteids, the characteristic solid products of the decomposition of which are leucin and tyrosin. At the same time the formation of glycocoll differentiates it from chondrin, from which, moreover, it can be readily distinguished by its non-precipitability by acetate of lead.

When it is mixed with copper sulphate a bright green liquid is formed, from which the copper cannot be thrown down free of organic matter. Addition of potash to the liquid merely changes the color from green to violet, which by boiling is further transformed into a pale red, but without any precipitation of hydrate. Hence the inapplicability of Trommer's sugar test in presence of gelatin, the cuprous oxide being soluble in gelatin solutions.

Treated with strong oxidizing agents, such as a mixture of sulphuric acid and bichromate of potash, or binocide of manganese, it exhibits a close resemblance in behavior to casein, formic and valerianic acids being the principal products, along with a small quantity of benzoic aldehyde. When solution of gelatin is mixed with chromate of potash alone, it forms a medium very sensitive to light, which converts it into an insoluble yellow mass.

As bones are capable of yielding one-third of their weight of solid gelatin, it follows that, if gelatin had a value equivalent to albuminoids, the bones of an animal would contain one-fifth of the total nutritive material in its body. Accordingly, at a time when gelatin was in high esteem for its food-value, recourse was had largely to this source, more especially in France, for a cheap, nutritive soup for soldiers, pauper establishments, and hospitals. To prepare such a soup the bones may be either simply boiled in water under pressure, as in a Papin's digester, or without pressure, or they may be



previously freed from salts of calcium by treatment with dilute hydrochloric acid. On the large scale the crushed bones are submitted to the combined action of steam at high pressure and a current of water percolating through the fragments. The bones, preferably in a fresh condition, or preserved by thorough drying or by antiseptic agents such as brine, are crushed by passing them between solid iron cylinders grooved longitudinally and kept revolving. They are then packed into a cylindrical cage, which can be lowered into a cylindrical jacket of rather larger diameter than itself, the whole closing with a well-fitting lid. A pipe for the entrance of water, regulated by a stopcock, projects from the top of the outer cylinder, and is connected before the lid is put on with an adjustable nozzle, through which the water trickles down among the caged bones. Another pipe is connected with the bottom of the apparatus for the passage of high-pressure steam. The gelatin solution may be removed at intervals by means of a stopcock at the bottom. The quantity of water percolating through the bones is carefully regulated in accordance with the varying pressure of the steam, so as to produce a soup of nearly uniform consistence.

*Isinglass*.—Isinglass or fish glue, in its raw state, is the swimming-bladder or sound of various species of fish. The sounds undergo no other preparation than careful drying, but in the drying they are variously treated and made up, so that the isinglass comes into commerce under the names of "leaf," "staple," "book," "pipe," "lump," "honeycomb," and other designations, according to its form. The finest isinglass, which comes from Russia, is prepared by cutting open the sounds, steeping them in water until the outer membrane separates from the inner, then washing the latter and exposing it to dry in the air. Russian isinglass is obtained from several species of sturgeon (*Acipenser*), found in the Volga and other tributaries of the Caspian Sea, in the Black Sea, and in the Arctic Ocean. Brazilian isinglass, obtained from Brazil and Guiana, is the produce of a large fish, *Silurus parkerii*, and probably some other species; and Manila and East Indian isinglass are yielded by species of fish not yet satisfactorily determined. The sounds of the common cod, the hake, and other *Gadidae* are also used as a kind of isinglass. The principal uses to which isinglass is applied are for jellies and confections, and as a clarifying or filtering medium for wine, beer, and other liquids. When used for culinary and confectionery purposes, isinglass is rolled into thin sheets and cut into fine shreds to facilitate its solution. For clarifying liquids its fibrous structure is of great value, as it forms a fine network in the liquid in which it is disseminated, and thereby mechanically carries down all the minute particles which render the liquid thick and turbid. Isinglass dissolved in strong acetic acid forms a powerful cement, much used for repairing glass, pottery, and similar small objects.

*Uses of Gelatin*.—The gelatin derivable from bones enters very largely into human food, in the stock for soups, etc., and as prepared gelatin, "calves'-foot jelly," and isinglass. In addition to the uses already alluded to, gelatin has many other applications in the arts. It is employed as a sizing agent in paper-making, and by painters it is also used for sizing or priming, and for preparing tempera colors. Further, it is used in the preparation of elastic molds of undercut work, and in the manufacture of inking rollers for printing. Gelatin treated with bichromate of potash, under the influence of light, undergoes a remarkable chemical and physical change, whereby it is rendered entirely inabsorbent of and insoluble by water. The change is due to the oxidizing effect of the bichromate; and the circumstance

has given rise to the numerous so-called carbon-processes introduced into photography by Swan, Johnson, Woodbury, Albert, Edwards and others, in all of which an image is produced in gelatin oxidized by chromium compounds. As insoluble glue may be prepared by adding to dissolved glue, just before using, a proportion of a solution of bichromate of potash, and such a preparation forms a useful waterproofing medium. Glue may be kept liquid at ordinary temperatures by the addition of concentrated acetic acid or of weak nitric acid. Dumoulin's liquid glue, which possesses powerful adhesive properties, is composed of glue in the proportion of 2 lbs. dissolved in 1 quart of water with 7 ozs. of nitric acid (sp. gr. 1.335) added. Mouth or lip glue is prepared by adding  $\frac{1}{2}$  lb. or thereabouts of sugar to each pound of dissolved glue. It forms solid but easily dissolved cakes, and as it can be sufficiently softened by the tongue, it is for many purposes extremely convenient. Transparent gelatin, brightly colored by dyeing substances, and cast in excessively thin sheets, is largely used for ornamental wrappings for bon-bons, etc.

**GELDERLAND, GELDERN.** See **GUELDERLAND, GUELDERS.**

**GELÉE, CLAUDE.** See **CLAUDE OF LORRAINE.**

**GELL, SIR WILLIAM.** (1777–1836), classical scholar and antiquarian, was born at Hopton, in Derbyshire, in 1777. He died at Naples in 1836. His drawings, representing a very large series of views of classical ruins and localities, and executed, if not with much artistic skill, yet with great detail and exactness, are now in the print room of the British Museum.

**GELLERT, CHRISTIAN FÜRCHTEGOTT,** German fabulist, hymn-writer, and moral philosopher, was born July 4, 1715, at Hainchen, in the Saxon Erzgebirge. He was educated at the university of Leipsic, where in 1751, he was appointed an extraordinary professor of philosophy, a position which he occupied till his death, December 13, 1769.

**GELLIUS, AULUS,** author of the *Noctes Atticæ*, was born in the first half of the second century of the Christian era, most probably in Rome, and died about 180. Nothing is known of his personal history except from incidental notices in his own book.

**GELON** succeeded Hippocrates as tyrant of Gela in 491 B.C., and by supporting the plebs of Syracuse in their quarrels against the aristocracy, became tyrant also of that city in 485 B.C. He used his power so discreetly that under him Syracuse attained an extraordinary degree of wealth and influence.

**GELSEMIUM,** a drug, consisting of the root of *Gelsemium*, a climbing shrub of the natural order *Loganiaceæ*. The plant is a native of the United States, growing on rich clay soil by the side of streams near the coast, from Virginia to the south of Florida. In the United States it is commonly known as the wild, yellow, or Carolina jessamine, although in no way related to the true jessamines, which belong to the *Oleaceæ*.

The pharmaceutical preparation known as gelsemin consists chiefly of the resin, combined with uncertain proportions of the other constituents of the root, and is prepared by precipitation with water from the strong tincture.

The medicinal properties of the root were discovered by accident, the infusion having been administered instead of that of some other root, with the result of curing the fever for which it was taken. It has attracted considerable attention in England as a remedy for certain forms of facial neuralgia, especially those arising from decayed teeth, or involving branches of the fifth nerve. In the United States it is more particularly valued for con-



rolling nervous irritability in fevers of a malarial type, in which it is said to excel every other known agent. It is also used in obstetric practice, causing or aiding in the dilatation of the os uteri in cases of childbirth. The dose is from one-sixtieth to one-twentieth grain of the alkaloid. In large doses it produces alarming symptoms, which occasionally terminate fatally. These appear to vary slightly in different cases, but the more prominent are pain in the forehead and in the eyeballs, giddiness, ptosis, a feeling of lightness in the tongue, slurred pronunciation, labored respiration, wide dilatation of the pupils, and impossibility of keeping an erect posture. The mind in most cases remains clear until shortly before death. The earliest and most prominent symptom of a fatal or dangerous dose is the drooping of the eyelids, which indicates the immediate administration of stimulants, for when the paralysis of the tongue which ensues extends to the epiglottis, deglutition becomes impossible, and the epiglottis is apt, unless the sufferer be placed in a forward position, to flap back and close the windpipe. The antidotes which have been found the most successful are brandy, aromatic spirits of ammonia (teaspoonful in water), tincture digitalis (from 10 to 30 drops in water), and morphia ( $\frac{1}{8}$  to  $\frac{1}{2}$  grain). It has been found that death may be averted by keeping up artificial respiration until the poison is eliminated by the kidneys.

GEMINIANI, FRANCESCO, a celebrated violinist, born at Lucca about 1680. In 1714 he arrived in London, where his performance and compositions attracted much attention. In 1761 he went to Dublin, where a servant robbed him of a musical manuscript on which he had bestowed much time and labor. His vexation at this loss is said to have hastened his death, which took place at Dublin on September 17, 1762.

GEMISTUS, or PLETHO, GEORGIUS, held high office under the Byzantine emperors during the first half of the fifteenth century, and derived his name, which signifies the Replete, from the extraordinary amount of his erudition. He is, however, chiefly memorable for having been the first person who introduced Plato to the Western world. This took place upon his visit to Florence in 1438, as one of the deputies from Constantinople on occasion of the general council.

GEMS, engraved with designs, whether adapted for sealing, or mainly for artistic effect, exist in a very large number of undoubtedly genuine examples, extending from the mists of Babylonian antiquity to the decline of Roman civilization, and again starting with a new but unnatural impulse on the revival of art. Apart from workmanship they possess the charms of color deep, rich and varied, of material unequalled for its endurance, and of scarcity which in many instances has been enhanced by the strangeness of the lands whence they came, or the fortuity of their occurrence. These qualities united within the small compass of a gem were precisely such as were required in a seal as a thing of constant use, so inalienable in its possession as to become naturally a personal ornament and an attractive medium of artistic skill, no less than the center of traditions or of religious and legendary associations. As regards the nations of classical antiquity all seals are classed as gems, though in many cases the material is not such as would strictly come under that heading. On the other hand, gems properly so called were not always seals. Many of the Babylonian cylinders could not have been so employed without great difficulty, and when Herodotus speaks of every Babylonian wearing a seal, it may have been in most cases no other than a talisman having an inherent power derived from the subject of its design, consisting perhaps mostly of figures of protecting deities. He adds that every Babylonian carried also a staff on which it was unlawful

for him not to have the figure of an apple, a rose, a lily, an eagle, or something else, as his badge, from which it may perhaps be inferred that having selected some such badge for his staff he would necessarily have the same for the seal with which he attested his name. But if that had been the case, then the great mass of existing cylinders could not have been seals in the ordinary sense. In Greece and Rome within historic times, gems were worn engraved with designs to show that the bearer was an adherent of a particular worship, the follower of a certain philosopher, or the attached subject of an emperor. It cannot be said that these gems may not have been used systematically as seals, but it is clear that they primarily served a different purpose. Again, when the sense of personal ornament naturally attaching to a seal increased, and the resources both of material and skill were enlarged, the process of engraving gems in cameo, that is, with the design in relief mostly in such stones as by their differently colored layers could be made to present a variety of surfaces, came largely into fashion. As a rule these cameos are of a date subsequent to that of Alexander the Great; but there are exceptions in an Egyptian cameo in the Louvre, said to belong to the twelfth dynasty, about 3000 B.C., and in some few Etruscan scarabs, which, having designs in intaglio on the face, have also reliefs engraved on the back, apparently in the same archaic manner of art as the intaglios. Such a scarab in carnelian was found at Orvieto in 1874 in a tomb along with vases dating from the beginning of the fifth century B.C., and it can be seen from the engraving of this gem, that while the design on the face presents evidently the same subject which occurs on a scaraboid found in the treasury of Curium in Cyprus by General Cesnola, the half-length figure of a Gorgon on the back seems to be the same in subject and treatment as a carnelian fragment, apparently cut from the back of a scaraboid, now in the British Museum.

In Egypt the favorite form of gem was a scarab (beetle), having a flat surface underneath, on which was engraved a hieroglyphic design. The common materials are green jasper and porcelain. From the soft nature of the porcelain, and from the strict adherence to the scarab shape, it may be inferred that they were used much less as seals than as a sort of badges or ornaments, and this is confirmed by the finding of large numbers of them in foreign countries, as at Camirus in Rhodes and in Etruria, where the hieroglyphics could not have been understood. No doubt it may be true that these specimens had been manufactured by Phœnicians for export to those countries merely as articles of ornament, but had the originals been strictly held by the Egyptians to be seals, it would have been the height of dishonesty in the Phœnicians to reproduce them in this way. In Egypt, however, the art of gem engraving was not confined altogether to scarabs, as may be seen among other interesting exceptions in the oblong intaglio of green jasper in the Louvre with a design on both sides, representing on the obverse, as known from the cartouche, Thothmes II. (1800 B.C.) slaying a lion, and on the reverse the same king drawing his bow against his enemies from a war chariot. In the Louvre also is an Egyptian gem, said to belong to the twelfth dynasty, 3000 B.C. But uninteresting in themselves as are the scarabs of Egypt, they have this accidental importance in the history of gem engraving that they furnished the Phœnicians with a model which they first improved as regards the intaglio by a freer spirit of design, gathered partly from Egypt and partly from Assyria (see the Phœnician scarabs from Tharras in Sardinia and from Cyprus).

The records of gem engravers in Greece begin in the



island of Samos, where Mnesarchus, the father of the philosopher Pythagoras, earned by his art more of praise than of wealth. Thence also came Theodorus, who made for Polycrates the seal of emerald, which, according to the curious story, was cast in vain into the deep sea on purpose to be lost. That the design on it was a lyre, as is stated in one authority, is unlikely, now that Benndorf's ingenious reading of Pliny has shown that the portrait statue of Theodorus made by himself was in all probability a figure holding in one hand a graving tool, and in the other, not, as previously supposed, a quadriga so diminutive that a fly could cover it with its wings, but a scarab with the engraving of a quadriga on its face, whence it is not unreasonable to conclude that this scarab in fact represented the famous seal of Polycrates. Shortly after 600 B.C. there was a law of Solon's forbidding engravers to retain impressions of the seals they made, and this date would fall in roundly with that of Theodorus and Mnesarchus, as if there had in fact been just about then a special activity and unusual skill. That the art had been practiced perhaps for several centuries before in Greece is probable from the general usage of sealing implied in Solon's law, from the extraordinary degree to which it obtained soon after his time, and from the influence which was exercised on the Greeks in such matters by the Phœnicians, Egyptians and Assyrians.

From the time of Theodorus to that of Pyrgoteles in the fourth century B. C., is a long blank as to names, but not altogether as to gems, the production of which may be judged to have been carried on assiduously from the constant necessity of seals for every variety of purpose. The references to them in Aristophanes, for example, the lists of them in the ancient inventories of treasures in Athens, and the number of them found by General Cesnola in the treasure chambers of Curium, in Cyprus, confirm this frequent usage during the period in question.

**GEMSBOK**, a species of antelope, abounding on the dry yet fertile plains of South Africa, where it feeds on the bulbs of water-root and other kinds of succulent vegetation, by means of which the antelopes of those regions are able to subsist without water for months together. It is a large and powerful animal, measuring about five feet in length and over three feet in height at the shoulders. Its horns, situated on the same plane with its forehead, exceed two feet in length, are almost straight, and are obscurely ringed throughout their lower half. The color of the upper part of the body is a rusty gray, and of the under part white, while these are separated from each other by a well-defined black band on each side. These bands unite on the breast, and are continued as a single black band until reaching the lower jaw, when they again divide and form two transverse bands on the head, terminating at the base of the horns. The head otherwise is white, as also are the limbs, with the exception of the thighs, which are black. The striking appearance presented by this antelope is in great part due to the absence of any blending in the different colors of its body. The gemsbok avoids the woods, living on the open plains in pairs or in small groups of four or five. Possessing powerful weapons of attack in its long, spear-like horns, and with ample courage to use them, this animal, especially when wounded, is a formidable antagonist both to man and to the numerous beasts of prey which are attracted to the karroos of the Cape by the presence of this and other ruminant species. It is said to defend itself not unfrequently with success against the lion. Its flesh is esteemed as a delicacy, and its hide forms a valuable leather.

**GENDARMERIE**, a body of troops or police in

France, composed of *gendarmes*, or men-at-arms. In the days of chivalry they were mounted and armed cap-a-pie, and attended each by five soldiers of inferior rank and more lightly armed. They were then furnished by the fiefs, and marched in the train of the knights and esquires. In 1439 this feudal gendarmerie was replaced by the *compagnies d'ordonnance* which Charles VII. formed when the English were driven out of France, and which were distributed throughout the whole extent of the kingdom for preserving order and maintaining the king's authority. These companies, fifteen in number, were composed of 100 lances or gendarmes fully equipped, each of whom was attended by at least three archers, one *coutillier* (soldier armed with a cutlass) and one *varlet* (soldier's servant). The states-general of Orleans (1439) had voted a yearly subsidy of 1,200,000 livres in perpetuity to keep up this national soldiery, which replaced the bands of mercenaries who for about a century had made France their prey. The number and composition of the *compagnies d'ordonnance* were changed more than once before the reign of Louis XIV. This sovereign on his accession to the throne found only eight companies of gendarmes; but after the victory of Fleurus (1690), which had been decided by their courage, he increased their number to sixteen. The four first companies were designated by the names of *Gendarmes écossais*, *Gendarmes anglais*, *Gendarmes bourguignons*, and *Gendarmes flamands*, from the nationality of the soldiers who had originally composed them; but at that time they consisted entirely of French soldiers and officers. These four companies had a captain-general, who was the king. The fifth company was that of the queen; and the others bore the names of the princes who respectively commanded them. This organization lasted till 1787, when Louis XVI. dissolved it, only retaining the *Gendarmes écossais* in his body-guard. The great Revolution swept away all these institutions of the monarchy, and, with the exception of a short revival of the *Gendarmes de la garde* at the Restoration, the word gendarmerie had thenceforth an altogether different meaning. It has been since that time employed to denote a military police, whose duties are to watch over the public safety, keep order, and enforce the execution of the laws. This police force superseded the old *maréchaussée*.

**GENDER** (Fr. *gendre*, from Lat. *genus*, *generis*, race, kind), in Grammar, is a distinction among words depending upon sex. Names applied to the male sex are said to be of the *masculine* gender, as *man*, *poet*; those applied to the female sex *feminine*, as *woman*, *poetess*; words that are neither masculine nor feminine are, as it were expressed in Latin, *neutrius generis*, "of neither gender;" and from this phrase grammarians have come to speak, somewhat incorrectly, of this class of words as being "of the neuter gender," and hence to reckon three genders. In English, the distinction of gender in nouns is chiefly marked in the pronouns substituted for them—*he*, *she*, *it*. Gender, strictly speaking, is applicable only to living beings distinguishable as male and female; but by the figure of speech called personification, inanimate objects are often spoken of as *he* and *she*. In Latin, Sanskrit, and Greek there were objects of *neutrius generis*.

**GENEALOGY**. The word "genealogy" which occurs twice in the New Testament, in the ordinary concrete sense of "pedigree" or "list of ancestors," is of somewhat frequent occurrence in the authorized version of the Old Testament scriptures. The scripture genealogies, properly so called, begin with the antediluvian period, and indeed with "the generations (or genealogy) of the heavens and of the earth." The descendants of Adam are traced through the lines of Cain and of



Seth respectively to the seventh and to the ninth generation.

With reference even to the most undisputed of the Biblical genealogies, it is important to remember, in the first place, that in them phrases implying sonship are not to be interpreted so strictly as they would be with us; and, secondly, that, in order to aid the memory by means of successions of symmetrical numbers, it was quite usual to manipulate a long list by dropping or even by introducing names at discretion.

The great antiquity of the early Roman (patrician) gentes is indisputable; and the rigid exclusiveness with which each preserved its *hereditates gentilitiæ* or *sacra gentilitia* is sufficiently illustrated by the fact that toward the close of the republic there were not more than fifty patrician families. Yet even in these it is obvious that, owing to the frequency of resort to the well-recognized practice of adoption, while there was every guarantee for the historical identity of the family, there was none (documents apart) for the personal genealogy of the individual.

The passion for genealogizing, which has been and is a marked characteristic of all the aristocracies of modern Europe, can be directly traced to the influence of feudalism and the principles of hereditary privilege which that system, in its later phases at least, so peculiarly encouraged. Along with the sharp separation of those families which alone were regarded as capable of holding real property or filling the higher offices of state, or indeed of engaging in any of what were reckoned as the more ennobling pursuits of life, arose the necessity for being able to determine with accuracy who were and who were not the persons entitled by birth to take a place within the privileged caste. As they forced their way up the stream of time, indeed, they were met at a comparatively early stage by a great barrier—consisting less in the paucity and inaccessibility of authentic documents than in what one might almost call the fatal fact of the absence of family names. Prior to the middle of the eleventh century these were entirely unknown; the documents speak merely of Eberhardus, Fridericus, Ernestus and the like, with at most the addition of the title. About 1050 began the custom of using surnames, but it made way so very slowly that, even at the close of the twelfth century, it had not diffused itself beyond the ranks of the higher nobility, and throughout the thirteenth the old habit of self-designation by the Christian name merely was still exemplified in a vast number of instances. At present, if we understand by a genealogy a tabulated and, as far as possible, an exhaustive statement of all the ramifications of a series of human generations, and by genealogical science that branch of history which aims at securing fullness and accuracy in the accounts men give of the antecedents of families which have attained to distinction, the modern genealogist cannot but be conscious that he occupies a comparatively narrow field, and one from which the larger interests of mankind are daily further receding. In the more ancient meaning of the word genealogy indeed, when it is used to denote that grander task of the historian which consists in tracing the origin, not of privileged families or castes merely, but of races and groups of races, and even of the species itself, the subject is one that has an ever widening and deepening significance; but in this sense it does not call for treatment apart from the biological sciences.

GENELLI, GIOVANNI BUONAVENTURA, was born at Berlin, September 28, 1798, and died at Weimar, November 13, 1868. In 1859 he was appointed a professor at Weimar, where he ended his days. Genelli painted few pictures, and it is very rare to find his canvases in public galleries.

GENERATION, a term in general biology or physiology, may comprehend the whole history of the first origin and continued reproduction of living bodies, whether plants or animals; but it is frequently restricted to the sexual reproduction of animals.

GENESIS. See PENTATEUCH.

GENET (*Genetta*), a genus of carnivorous mammals belonging to the *Viverridæ* or family of civets. It contains six species, all of which are found exclusively in Africa, with the exception of the common genet (*Genetta vulgaris*), which occurs also throughout the south of Europe and in Palestine, where Tristram notes it as occurring on Mount Carmel. The fur of this species is of a dark gray color, thickly spotted with black, and having a dark streak along the back, while the tail, which is nearly as long as the body, is prettily ringed with black and white. The genet is abundant in the south of France and in Spain, where it frequents the banks of streams, and feeds on the smaller mammals and on birds.

GENEVA, a city and canton of Switzerland—the canton being, with one exception, the smallest, and the city, without exception, the largest within the limits of the confederation.

The canton of Geneva has an area of 107.8 square miles. The greater part of its frontier is conterminous with France, the department of Haute-Savoie lying to the south, and that of Ain to the west and north; while it is connected with the Swiss canton of Vaud (Waadt) along a line of more than three and one-half miles.

The city of Geneva is situated at the southwestern extremity of the beautiful lake of the same name, whence the noble current of the Rhone flows westward under the five bridges by which the two halves of the town communicate with each other. The actual site of the town, apart from the river and the lake, is not so picturesque as that of many other places in Switzerland. Though the central plateau, crowned as it is by the cathedral, gives certain relief to the general view from the water, a large proportion of the town is built on the alluvial flats along the river. But what Geneva lacks in picturesqueness it now makes up in an appearance of prosperity and comfort—presenting fine quays, well-ordered pleasure grounds, good streets, and substantial houses, and, in the number and extent of its modern suburbs, giving evidence that its prosperity is not a thing of the past. Population (1890), 75,000.

GENEVA, THE LAKE OF (the Latin *Lacus Lemanus* or Lake Lemman, also known in the Middle Ages as Lac Losannete or Lake of Lausanne, and as Mer du Rhône or Sea of the Rhone), is the largest of the Swiss lakes, having an area of 223 square miles. Its general form is that of a crescent, the northern shore being almost the arc of a circle, with a radius of twenty-one and one-half miles. The eastern end of the crescent is broad and rounded, while the western tapers toward Geneva. Its maximum breadth, between Morges and Amphion, is eight and one-half miles. It is divided into two portions, the Great and Little Lake, by the strait of Promonthoux, which is not much more than two miles across. The Great Lake is thirty-nine miles long, with a mean breadth of six miles, and the Little or Western Lake is fourteen miles long, with a mean breadth of rather more than two miles.

GENEVA, growing town of Ontario county, N. Y., is beautifully situated at the north end of Seneca Lake, on the New York Central Railway and at the terminus of the Ithaca branch railway, fifty-two miles east-southeast of Rochester. It has banking and telegraph facilities, and a population (1890) of 6,500.

GENEVA AWARD is the name popularly applied to the sum of £3,229,166, paid by Great Britain as



indemnity for injuries inflicted by the Confederate Crusier "Alabama," which had been allowed to sail from a British port in defiance of international law, in the year 1862. The award was made by a commission appointed by the President, the Queen, the king of Italy, the emperor of Brazil, and the Swiss president, and was devoted to paying for private property destroyed by the rebel ship.

GENEVA CONVENTION, an agreement concluded at an international conference which was held at Geneva in 1864, under the presidency of General Dufour the Swiss plenipotentiary, for the purpose of ameliorating the condition of the sick and wounded in time of war. The credit of originating this conference must be given to two citizens of Geneva, Dunant, a physician, who published a startling account of what he had seen in two military hospitals on the field of Solferino, and his friend Moynier, chairman of the Geneva society of public utility, who took up the idea of "neutralizing the sick wagons," formed associations for its agitation, and at length pressed it upon the governments of Europe, most of which sent representatives to the conference. The convention was drawn up and signed by them on August 22d, and since then it has received the adherence of every European power, and one Asiatic (viz., Persia).

A second conference was held at Geneva on the same subject in 1868, and a supplementary convention drawn out, which, though not formally signed, has been acquiesced in by all the signatories of the original convention, except the pope, and which, while still unratified, was adopted provisionally by France and Germany in their war of 1870. It consists partly of interpretations of the former convention, and partly of an application of its principles to maritime wars.

GENEVIÈVE, or GENOVEFA, St., patroness of Paris, flourished during the latter half of the fifth century. She was born about 425 at Nanterre, near Paris, or according to another tradition at Montriére. Her death occurred in 500, or according to another account in 512, and her remains were ultimately laid in the chapel bearing her name, which has now become merged in the Pantheon or Église St. Geneviève.

GENGA, GIROLAMO, a painter and architect, was born at Urbino about 1476. He died in the same city in 1551.

GENGIS KHAN. See JENGHIZ KHAN.

GENLIS, STEPHANIE-FELICITE DUCREST DE SAINT AUBIN, COMTESSE DE, a voluminous French writer, was born of a noble but impoverished Burgundian family, at the Chateau de Champcery, near Autun, on January 25, 1746. Her marriage with the Comte de Genlis, a colonel of grenadiers, who afterward became marquis of Sillery, took place in her sixteenth year, but was not suffered to interfere with a rapidly developing taste for acquiring and imparting knowledge. Some years later, through the influence of her aunt, Madame de Montesson, who had been clandestinely married to the Duke of Orleans, she entered the Palais Royal as lady-in-waiting to the duchess of Chartres (1770); and, after having acted with great energy and zeal as governess to the daughters of the family, she was in 1781 appointed by the duke to the responsible office of "gouverneur" of his sons, a bold step which though it led to the resignation of all the tutors as well as to much social scandal, can hardly in fairness be held to have seriously prejudiced the intellectual interests at least of those committed to her charge. The better to carry out her theory of education she wrote several works for the use of her royal pupils, the best known of which are the *Theâtre*

*d'Education* (1779-80), a collection of short comedies for young people, and *Les Annales de la Vertu* (1781). When the Revolution of 1789 occurred, Madame de Genlis showed herself not unfavorable to the movement, and is said to have had considerable influence on the conduct of the Duke of Orleans; but the fall of the Girondins in 1795 compelled her to take refuge in Switzerland along with her pupil, Mademoiselle d'Orleans. It was in this year that her husband, the marquis of Sillery, from whom she had been separated since 1782, perished on the scaffold. An "adopted" daughter, Pamela Berkley or Simms, had been married to Lord Edward Fitzgerald in the preceding December. In 1794 Madame de Genlis fixed her residence at Berlin, but having been expelled by the orders of King Frederick William, she afterward settled in Hamburg, where she supported herself for some years by writing and painting. After the revolution of the 18th Brumaire (1799) she was permitted to return to France, and was received with favor by Napoleon, who gave her apartments at the arsenal, and afterward assigned her a pension of 6,000 francs. During this period she wrote largely, and produced what is generally considered to be her best romance, entitled *Mademoiselle de Clermont*. At the Restoration she succeeded in adjusting herself once more to the new state of things, and continued to write with all her former diligence. Her later years were occupied largely with literary quarrels. Madame de Genlis before her death, which occurred on December 31, 1830, had the satisfaction of seeing her former pupil, Louis Philippe, seated on the throne of France.

GENOA, in literary Italian *Genova*, in the local dialect *Zene*, in Latin and German *Genua*, in mediæval Latin *Janua*, and in French *Gênes*, one of the most important cities of Italy, is situated in what was formerly known as Liguria, on the northern coast of the Mediterranean near the middle of the Gulf of Genoa. The city, as seen from the sea, is "built nobly," and deserves the title it has acquired or assumed of the Superb. The present line of circumvallation dates from 1626-32, the period when the independence of Genoa was threatened by the dukes of Savoy. There are eight gates in all—the more important being Porta Pila and Porta Romana toward the east, and the new Porta Lanterna or Lighthouse Gate to the west. Genoa claims the distinction of being the birthplace of Christopher Columbus.

GENOVA, LUCHETTO DA. This is the familiar name given to the painter Luca Cambiasi (written also Cambiaso or Cangiagio), who was born at Moneglia, in the Genoese state, in 1527, and died in 1585.

GENOVESI, ANTONIO, an Italian writer on philosophy and political economy, was born in November, 1712, at Castiglione, near Salerno. He died in 1769.

GENSERIC, or GENSERIC, king of the Vandals, and the most formidable of the Gothic invaders of the Roman empire, was the natural son of Godegiselus, the founder of a Vandal kingdom in Spain, and was born at Seville about 406. In 435 Genseric concluded a treaty with the Romans by which he retained possession of western Numidia and Mauretania; but peace was not of long duration, and in October, 439, he captured Carthage, which he made the capital of his kingdom. Genseric was an Arian, and cruelly persecuted the orthodox Catholics in Africa. In 455 at the invitation of Eudocia, who wished to be revenged on Maximus, the murderer of her husband Valentinian, he fitted out an expedition against Rome, and after storming the city, gave it up during fourteen days to be pillaged by his soldiers. Eudocia and her daughters he carried captive to Carthage, where she was retained in prison till 462. Two attempts were



made by the Romans to avenge themselves on the barbarians,—the first by Majorian, emperor of the West, in 457, and the second by Leo, emperor of the East, in 468. Both attempts, however, signally failed, and in 475 Leo's successor Zeno concluded a truce. Genseric's dominion ultimately included Sicily, Sardinia, Corsica, and the Balearic isles; and he even extended his conquests to Thrace, Egypt, and Asia Minor. He died in 477.

**GENTIAN**, botanically *Gentiana*, a large and typical genus of herbaceous plants forming the type of the natural order *Gentianaceæ*. The genus comprises about 180 species—most of them perennial plants growing in hilly or mountainous districts, chiefly in the northern hemisphere, some of the blue-flowered species ascending to the height of 16,000 feet in the Himalaya mountains. Gentian is considered by therapeutists to be one of the most efficient of the simple bitter tonics, that is, of that class of substances which act upon the stomach so as to invigorate digestion and thereby increase the general nutrition, without exerting any direct influence upon any other portion of the body than the alimentary canal. It is used in dyspepsia, chlorosis, anæmia, and various other diseases, in which the tone of the stomach and alimentary canal is deficient, and is sometimes added to purgative medicines to increase and improve their action. In veterinary medicine it is also used as a tonic, and enters into a well-known compound called *diapente* as a chief ingredient.

**GENTILESCHI**, **ARTEMISIA** and **ORAZIO DE'**, painters. **ORAZIO** is generally named Orazio Lomi de' Gentileschi; it appears that De' Gentileschi was his correct surname, Lomi being the surname which his mother had borne during her first marriage. He was born at Pisa in 1565. His works generally are strong in shadow and positive in color. He died in England in 1646. **ARTEMISIA**, Orazio's daughter, was born in 1590. Studied first under Guido, acquired much renown for portrait-painting, and considerably excelled her father's fame. She was a beautiful and elegant woman. Her most celebrated composition is Judith and Holofernes, in the Pitti palace. She accompanied her father to England, but did not remain there long. She settled in Naples, whither she returned after her English sojourn; she lived there in no little splendor, and there she died in 1642.

**GENTILI**, **ALBERICO**, may fairly be called the founder of the science of international law. He was born January 14, 1552, at Sanginesio, a small town of the march of Ancona. After taking the degree of doctor of law at the university of Perugia, and holding a judicial office at Ascoli, he set out for England. He arrived at Oxford in the autumn of 1580, with a commendatory letter from the earl of Leicester, at that time chancellor of the university, and was shortly afterward qualified to teach by being admitted to the same degree which he had taken at Perugia. His lectures on Roman law soon became famous. In 1584 he was consulted by government as to the proper course to be pursued with Mendoza, the Spanish ambassador, who had been detected in plotting against Elizabeth. In 1588 Alberico selected the law of war as the subject of the law disputations at the annual "Act" which took place in July. In 1600 he was admitted to be a member of Gray's Inn, and in 1605 was appointed standing counsel to the king of Spain. He died June 19, 1608.

**GENTILLY**, a town of France, in the department of the Seine, is situated on the Bièvre, a short distance south of the fortifications of Paris.

**GENTZ**, **FRIEDRICH VON**, born at Breslau, May 2, 1764, aptly and accurately described by his distinguished friend Varnhagen von Ense as a writer-statesman. He was more than a publicist or political writer.

His position was peculiar, and his career without a parallel. He broke ground in literature in 1794, by a translation of the celebrated *Essay on the French Revolution*, followed in 1794 and 1795 by translations from Mallet du Pan and Mounier. In 1795 he founded and edited a monthly journal which soon came to an untimely end. In November, 1797, he published a pamphlet under the title of a *Sendschreiben* or *Missive* addressed to Frederick William III. of Prussia on his accession, pointing out the duties of the new sovereign and especially recommending the complete freedom of the press. In the course of the next three years he contributed to the *Historisches Journal* a series of articles "On the Origin and Character of the War against the French Revolution," with express reference to Great Britain. These led to his visiting England, where he formed intimate relations with Mackintosh, Lord Grenville, Pitt and other eminent men, which proved lasting, flattering, and remunerative. He was first secretary to the congress of Vienna in 1814, where, besides his regular duties, he seems to have made himself useful to several of the plenipotentiaries, as he notes in his diary that he received 22,000 florins in the name of Louis XVIII. from Talleyrand, and £600 from Lord Castlereagh, accompanied by "*les plus folles promesses*," and acted in the same capacity at the congress or conference of Paris in 1815, of Aix in 1818, Karlsbad and Vienna in 1819, Troppau and Laybach in 1820 and 1821, and Verona in 1822. When sixty-seven years old he became infatuated with Fanny Ellsler, the dancer. He died June 9, 1832.

**GENUS** (Lat. a kind), in Natural History, a group of species, closely connected by common characters or natural affinity. In all branches of zoölogy and botany, the name of the genus forms the first part of the scientific name of each species, and is followed by a second word—either an adjective or substantive—which distinguishes the particular species. Thus, in *solanum tuberosum* (the potato), *Solanum* is the generic, and *tuberosum* the specific (sometimes styled the *trivial*) name.

**GEOCENTRIC** means having the earth for center; thus the moon's motions are geocentric. The geocentric latitude of a planet is the inclination to the plane of the ecliptic of a line connecting it and the earth; the geocentric longitude being the distance measured on the ecliptic from the first point of Aries to the point in the ecliptic to which the planet as seen from the earth is referred.

**GEODES** (Gr. earthy) are rounded, hollow concretions, or indurated nodules, either empty or containing a more or less solid and free nucleus, and having the cavity frequently lined with crystals.

**GEODESY** ( $\gamma\eta$ , Gē, the earth;  $\delta\alpha\acute{\iota}\omega$ , daíō, I divide,) is the science of surveying extended to large tracts of country, having in view not only the production of a system of maps of very great accuracy, but the determination of the curvature of the surface of the earth, and eventually of the figure and dimensions of the earth. This last, indeed, may be the sole object in view, as was the case in the operations conducted in Peru and in Lapland by the celebrated French astronomers Bouguer, La Condamine, Maupertuis, Clairaut, and others.

The basis of every extensive survey is an accurate triangulation, and the operations of geodesy consist in—the measurement, by theodolites, of the angles of the triangles; the measurement of one or more sides of these triangles on the ground; the determination by astronomical observations of the azimuth of the whole network of triangles; the determination of the actual position of the same on the surface of the earth by observations, first for latitude at some of the stations, and secondly for longitude.



To determine by actual measurement on the ground the length of a side of one of the triangles, wherefrom to infer the lengths of all the other sides in the triangulation, is not the least difficult operation of a trigonometrical survey. When the problem is stated thus—To determine the number of times that a certain standard or unit of length is contained between two finely marked points on the surface of the earth at a distance of some miles asunder, so that the error of the result may be pronounced to lie between certain very narrow limits—then the question demands very serious consideration. The representation of the unit of length by means of the distance between two fine lines on the surface of a bar of metal at a certain temperature is never itself free from uncertainty and probable error, owing to the difficulty of knowing at any moment the precise temperature of the bar; and the transference of this unit, or a multiple of it, to a measuring bar, will be affected not only with errors of observation, but with errors arising from uncertainty of temperature of both bars. If the measuring bar be not self-compensating for temperature, its expansion must be determined by very careful experiments. The thermometers required for this purpose must be very carefully studied, and their errors of division and index error determined.

Various geodetic surveys have been made from time to time by different governments, for different purposes, and in widely different countries and climates. The most noteworthy are the United States coast survey and the French survey in Algiers for the purpose of determining the true length of the distance from the equator to the north pole along the arc of the meridian in order to furnish an invariable and uniform standard of measurement, which was finally fixed at  $\frac{1}{10000000}$  of this distance, or the French meter.

The instruments used in these experiments are too complex and numerous to be described here, and for an account of them the reader is referred to any standard work on the higher branches of trigonometry, engineering and applied mathematics.

**GEOFFREY OF MONMOUTH** (1110?–1154), one of the most famous of the Latin chroniclers, was born at Monmouth early in the twelfth century. Very little is known of his life. He became archdeacon of the church in Monmouth, and in 1152 was elected bishop of St. Asaph. He died in 1154. Three works have been attributed to him—the *Chronicon sive Historia Britonum*; a metrical *Life and Prophecies of Merlin*; and the *Compendium Gaufredi de Corpore Christi et Sacramento Eucharistiae*.

**GEOFFROY SAINT-HILAIRE, ÉTIENNE**, a celebrated French naturalist, was the son of Jean Gérard Geoffroy, procurator and magistrate of Étampes, Seine-et-Oise, where he was born, April 15, 1772. Destined by his friends for the church, he entered, as an exhibitor, the college of Navarre, in Paris. Science, however, offered to him a career more congenial to his tastes than that of an ecclesiastic, and, after some persuasion, he gained from his father permission to remain in Paris, and to attend the lectures at the Collège de France and the Jardin des Plantes, on the condition that he should likewise read law. Having, before the close of the year 1790, taken the degree of bachelor of law, he became a student of medicine, but the lectures of Fourcroy at the Jardin des Plantes, and of Daubenton at the Collège de France, and his favorite scientific pursuits gradually came to occupy his almost exclusive attention. His studies at Paris were at length suddenly interrupted, for, on August 12 or 13, 1792, Haüy and the other professors of Lemoine's college, as also those of the college of Navarre, were arrested by the revolutionists as priests, and confined in the prison of St.

Firmin. At the beginning of the winter of 1792 he returned to his studies in Paris, and in March of the following year Daubenton, through the interest of Bernardin de Saint Pierre, procured him the office of sub-keeper and assistant demonstrator of the cabinet of natural history, vacant by the resignation of Lacépède. By a law passed June 10, 1793, Geoffroy was appointed one of the twelve professors of the newly constituted museum of natural history, being assigned the chair of zoölogy.

In 1798 Geoffroy was chosen a member of the great scientific expedition to Egypt. With Delile and Larrey, on the capitulation of Alexandria, in August, 1801, he resisted the claim made by the British general Hutchinson to the collections of the expedition, sending him word that, were his demands persisted in, history would have to record of him that he also had burnt a library in Alexandria. Early in January, 1802, Geoffroy returned to his accustomed labors in Paris. He was elected a member of the academy of sciences of that city in September, 1807. In March of the following year the emperor, who had already recognized his national services by the award of the cross of the Legion of Honor, selected him to visit the museums of Portugal, for the purpose of procuring from them collections, and these, though in the face of considerable opposition from the British, he eventually was successful in retaining as a permanent possession for his country. In 1809, the year after his return to France, he was made professor of zoölogy of the faculty of sciences at Paris, and from that period he devoted himself more exclusively than before to the study of anatomical philosophy. In 1815 he was elected political representative for his native town. Three years later he gave to the world the first part of his celebrated *Philosophie Anatomique*, the second volume of which, published in 1822, and memoirs subsequently written, account for the formation of monstrosities on the principle of arrest of development, and of the attraction of similar parts. In July, 1840, Geoffroy became blind, and some months later he had a paralytic attack. From that time his strength gradually failed him. He resigned his chair at the museum in 1841, and, on June 19, 1844, at the age of seventy-two, he died.

**GEOFFROY SAINT-HILAIRE, ISIDOR**, a French zoölogist, son of the preceding, was born at the Jardin des Plantes, Paris, December 16, 1805. In his earlier years he showed an aptitude for mathematics, but eventually he devoted himself to the study of natural history and of medicine, and in 1824 he was appointed assistant naturalist to his father. He was elected a member of the academy of sciences at Paris, April 15, 1833; was, in 1837, appointed to act as deputy for his father at the faculty of sciences in Paris, and in the following year was sent to Bordeaux to organize a similar faculty there. He became successively inspector of the academy of Paris (1840), professor of the museum on the retirement of his father, inspector general of the university (1844), a member of the royal council for public instruction (1845), and, on the death of Blainville, professor of zoölogy at the faculty of sciences (1850). In 1854 he founded the Acclimatization Society of Paris, of which he was president. He died at Paris, November 10, 1861.

**GEOGRAPHY** is the science which describes the earth, the term being derived from two Greek words  $\gamma\eta$  (Gē), the earth, and  $\gamma\rho\acute{\alpha}\phi\omega$  (graphō), I write. By means of geography the surface of the earth is delineated and described, boundaries are defined, areas are exactly measured, and the relative positions of places are determined. Geography thus embraces a wide range of subjects, and it has been found necessary to divide its study into several distinct sections.



I. Comparative Geography traces the history of discovery, and records the changes which have taken place in land and sea in historic times.

II. Mathematical Geography explains the figure, magnitude, and motion of the earth, teaches how to determine the positions of places on its surface, and shows how the whole or any portion of the earth may, on the principles of projection, be delineated on a map or chart.

III. Physical Geography is the description of the actual state of the earth's surface in its three great divisions — land, sea, and air.

IV. Political Geography describes the earth as divided into countries, occupied by various nations, and improved by human art and industry.

#### VIEW OF THE PROGRESS OF GEOGRAPHICAL DISCOVERY.

Four main causes have led to geographical discovery and exploration, namely, commercial intercourse between different countries, the operations of war, pilgrimages and missionary zeal, and in later times the pursuit of knowledge for its own sake, which is the highest of all motives.

The Phœnicians are the earliest commercial people of whose discoveries we have any correct accounts. They first explored the shores of the Mediterranean, and eventually extended their voyages through the Straits of Gibraltar, and visited the western shores of Spain and Africa, planting colonies and opening wider fields for their commerce by instructing the natives in their arts and improvements. They also monopolized the trade with India; and their chief emporium, the rich city of Tyre, was the center whence the products of the east and west were distributed.

The great Phœnician colony of Carthage retained in full vigor the commercial spirit of the parent state. The Carthaginians traded on the coasts of Spain and Gaul, and extended their discoveries southward along the coast of Africa, and to the Fortunate Islands, now known as the Canaries.

The conquests of Alexander the Great, by making known the vast empire of Persia, materially enlarged the bounds of geographical knowledge. Although the course of his expedition was mainly by land, the mind of the conqueror was also intent on commerce and maritime discovery. In 327 B.C. Alexander led an army of Greeks down the valley of the Cabul river into the Punjab, and his expedition resulted in a voyage of discovery from the mouth of the Indus to that of the Tigris, and in opening direct intercourse between Grecian and Hindu civilization.

The dynasties founded by Alexander's generals, Seleucus, Antiochus, and Ptolemy, encouraged the same spirit of enterprise which their master had so carefully fostered, and extended geographical knowledge in several directions.

The Ptolemies of Egypt showed equal anxiety to extend the bounds of geographical knowledge.

The Romans did not encourage navigation and commerce with the same ardor as their predecessors; still the luxury of Rome, which gave rise to demands for the varied products of all the countries of the known world, led to an active trade both by ships and caravans. But it was the military genius of Rome, and the ambition for universal empire, which led not only to the discovery, but also to the survey of nearly all Europe, and of large tracts in Asia and Africa.

In all time, while warriors and explorers extended the area of geographical knowledge, there have been students who have striven to systematize and put into due form the accumulated information. From the first it

was perceived that a knowledge of localities could not be attained without some notion of their relative positions, and their distances from each other. Consequently the attempts to establish fixed principles on which the surface of the earth, or any portion of it, could be delineated, were almost coeval with the earliest voyages of discovery.

The first attempt made to determine the position of places appears to have depended on the division of the earth into "climates," distinguished by the species of animals and plants produced in each. This method, however, was soon abandoned for another, which consisted in observing at places the length of the longest and shortest days by means of a "gnomon." An upright pillar of a known height being erected on a level pavement, by observing the lengths of the meridian shadows the progress of the sun from tropic to tropic was traced. The most ancient observation with the gnomon is that of Pythias, in the days of Alexander the Great, who observed at the summer solstice at Massilia that the length of the meridian shadow was to the height of the gnomon as  $213\frac{1}{8}$  to 600, an observation which makes the meridian altitude of the sun at Marseilles on that day  $70^{\circ} 27'$ . The merit of the invention of the gnomon in Greece is ascribed to the astronomical school of Miletus; but there is reason to believe that this method of observation was invented in Egypt, and that Thales carried the knowledge of it into Greece. This was the first step toward connecting geography with astronomy; and little further advance was made until the establishment of the famous astronomical school of Alexandria.

Eratosthenes (276–196 B.C.) was the first who reduced geography to a regular system, and laid its foundations on clear and solid principles.

The improvements introduced by Eratosthenes were perfected in principle by Hipparchus, who flourished from 160 to 135 B.C. He was the first astronomer who undertook the arduous task of making a catalogue of the stars and fixing their relative positions.

The most ancient maps that have reached modern times are those which illustrate Ptolemy's geography, but an earlier map made for Aristagoras, king of Miletus (500 B.C.), is minutely described by Herodotus. Ptolemy composed his system of geography in the reign of Antoninus Pius, about 150 A.D.

Although Ptolemy was the first scientific geographer whose work has come down to us in a complete form, the earlier labors of Strabo, who lived in the reigns of Augustus and Tiberius, are of equal value, and we fortunately possess the whole of his seventeen books. Pliny also devoted two books of his extensive work to geography; and the scattered geographical notices of other ancient writers were collected into one work of four volumes by Hudson, and published between 1698 and 1712, with notes by Dodwell. From the days of Ptolemy to the revival of letters in Europe, little was done toward the scientific improvement of geographical science, though military and commercial enterprise led to a great extension of knowledge of the earth's surface.

The emperor Justinian sent two Nestorian monks to China, who returned with eggs of the silkworm concealed in a hollow cane, and thus silk manufactures were established in the Peloponnesus and the Greek Islands. It was also in the reign of Justinian that Cosmos Indicopleustes, an Egyptian merchant, made several voyages, and afterward composed his *Topographia Christiana*, containing a particular description of India. The great outburst of Mahometan conquest was followed by an Arabian civilization, having its centers at Cordova and Baghdad, in connection with which geography again received a share of attention.



From the ninth to the thirteenth century intelligent Mahometan travelers wrote accounts of what they had seen and heard in distant lands, which have been handed down to us; while the caliphs of Baghdad encouraged the study of geographical science.

The earliest Arabian traveler whose observations have come down to us is the merchant Suleiman, who embarked in the Persian Gulf and made several voyages to India and China in the middle of the ninth century. Suleiman's information was supplemented by that collected by another writer named Abu Zaid; and, so far as India is concerned, this work is the most important that we possess before the grand epoch of the discoveries of Marco Polo.

The Mongol and Turkish dynasties, which succeeded each other after the fall of the Arabian caliphs, also produced rulers who encouraged geographical science. Philosophers assembled at the court of Hulaku Khan (1253-1264) at Maraghah in the north of Persia; and his friend Nâsiru'd-Dîn was the most famous astronomer of the age.

The Northmen of Denmark and Norway, who were the terror of all the coasts of Europe, and who established themselves in England and Ireland, in France and Sicily, were also great promoters of geographical discovery during the darkest period of the Middle Ages. The Northmen were far from being always vikings, bent only on rapine and plunder. They were very often peaceful merchants.

In the end of the ninth century Iceland was colonized from Norway; and in 985 the intrepid viking Erik surnamed the Red discovered Greenland, and induced some of his Icelandic countrymen to settle on its inhospitable shores. In 986 young Bjorni, son of one of Erik's comrades, sailed from Iceland to join his father in Greenland, but shaped his course too far to the south, and was the discoverer of America. He sailed along the coasts of Connecticut, Massachusetts, and Nova Scotia, before he eventually found the fjord on the Greenland coast where his father dwelt. Then Leif, the son of Erik, bought the ship from young Bjorni and made another voyage of discovery, and once more the coast of America was visited. Other expeditions were undertaken by his two brothers, intercourse was kept up between Greenland and Norway, and the *saga* of Thorfinn tells us of other voyages to America. The last that was heard of the Norwegian colonies in Greenland was in a brief of Pope Nicolas V. in 1448, where it is stated that, thirty years before, the settlements had been destroyed by the attacks of savages.

At length the long period of barbarism which accompanied and followed the fall of the Roman empire drew to a close in Europe. The crusades had a very favorable influence on the intellectual state of the Western nations. Interesting regions, known only by the scant reports of pilgrims, were made the objects of attention and research; while religious zeal, and the hope of gain, combined with motives of mere curiosity, induced several persons to travel by land into remote regions of the East, far beyond the countries to which the operations of the crusaders extended. Among these was Benjamin of Tudela, who set out from Spain in 1160, traveled by land to Constantinople, and having visited India and some of the eastern islands, returned to Europe by way of Egypt, after an absence of thirteen years.

Christian missionary zeal was another motive for exploration. John of Plano Carpini, in Perugia, a Franciscan monk, was the head of one of the missions dispatched by Pope Innocent to call the chief and people of the Tartars to a better mind. He reached the headquarters of Batu, on the Volga, in February, 1246; and, after some stay, went on to the camp of the great

khan near Karakorum, and returned safely in the autumn of 1247. A few years afterward, a Fleming named Rubruquis was sent by St. Louis on a mission to the Tartar chiefs, and wrote a very interesting narrative.

Nicolo and Maffeo Polo, two brothers who traded with the East, visited Tartary. The recital of their travels fired the youthful imagination of young Marco Polo, the son of Nicolo, and he set out for the court of Kublai Khan, with his father and uncle, in 1265. After a journey of three years and a half they reached Yeuking, near the spot where Peking now stands, and young Marco was enrolled among the attendants of honor of the Grand Khan. The work of Marco Polo is the most valuable narrative of travels that appeared during the Middle Ages, and its latest and ablest editor truly says, "All other travelers of that time are but stars of a low magnitude beside the full orb of Marco Polo."

Still these minor orbs continued to do useful geographical work, while striving to spread the doctrines of the Gospel.

Ibn Batuta, the great Arab traveler, is separated by a wide space of time from his countrymen already mentioned, and he finds his proper place in a chronological notice after the days of Marco Polo—for he was not born at Tangier until 1304. He began his wanderings in 1325, his career thus coinciding in time with that of Sir John Mandeville (1322-1356), but the Moor was more trustworthy than the Englishman. Ibn Batuta went by land from Tangier to Cairo, then visiting Syria, and performing the pilgrimages to Medina and Mecca. After exploring Persia, and again residing for some time at Mecca, he made a voyage down the Red Sea to Yemen, and traveled through that country to Aden, which remarkable place he correctly describes. Thence he visited the African coast, touching at Momboas and Quiloa, and then sailed across to Ormuz and the Persian Gulf. He crossed Arabia from Bahreyn to Jiddah, traversed the Red Sea and the desert to Syene, and descended the Nile to Cairo. After this he revisited Syria and Asia Minor, crossed the Black Sea to Caffa, and proceeded to the camp of the khan of Kipchak at the foot of the Caucasus. Ibn Batuta crossed the desert from Astrakhan to Bokhara, and went over the Hindu Kush to Cabul, reaching the Indus somewhere below Larkhana, in 1333. He was sent on an embassy to China in 1342, traveling by land from Delhi to the seaport; whence the ambassadors sailed down the west coast of India to Calicut, and then visited the Maldiv Islands and Ceylon. He made a voyage through the islands to China, and on his return he proceeded from Malabar to Baghdad and Damascus, where he got his first news from home and heard of his father's death. Finally he reached Fez, the capital of his native country, in November, 1349, after an absence of twenty-four years, and came to the conclusion that there was no place like home. After a journey into Spain, he set out for Central Africa in 1352, and reached Timbuctoo and the Niger, returning to Fez in 1353. He had traveled over a length of at least 75,000 English miles. His narrative was committed to writing from his dictation, by order of the sultan of Fez, and the work was completed in December, 1355. Ibn Batuta died at the age of seventy-three, in the year 1377.

The peaceful reign of Henry III. of Castile is famous for the attempts of that prince to extend the diplomatic relations of Spain to the remotest parts of the earth. Mariana tells us that he sent embassies to the princes of Christendom and to the Moors. In 1403 the Spanish king sent a knight of Madrid, named Ruy Gonzalez de Clavijo, to the court of the mighty Timur, at Samarkand. He returned in 1406, and died soon after, but not before he had written a most valuable and interest-



ing narrative of his travels from Constantinople through Persia and Khorasan to the Oxus, and thence by the Iron Gates to Samarkand.

Several Italians continued to make important journeys in the East during the fifteenth century. One of the most remarkable of the Italian travelers was Ludovico di Varthema, whose insatiable desire to see foreign countries induced him to leave his native land in the year 1502.

In mentioning Varthema we have anticipated events; but in the fifteenth century the time was approaching when the discovery of the Cape of Good Hope was almost indefinitely to widen the scope of geographical enterprise. The great event was preceded by the discovery of the polarity of the magnetic needle, and the consequent construction of the mariner's compass. This most important discovery appears to have been made in China, and it is uncertain when the compass was first used by Western nations. Its introduction has been attributed to Flavio Gioia, a citizen of Amalfi, in the kingdom of Naples, about the year 1307. Navigation was then destined to make rapid progress. The growing spirit of enterprise, combined with the increasing light of science, prepared the states of Europe for entering upon that great career of discovery, of which the details constitute the materials for the history of modern geography. Portugal took the lead in this new and brilliant path, and foremost in the front rank of the worthies of this little hero-nation stands the figure of Prince Henry the Navigator.

Having acquired military renown by the capture of Ceuta in 1415, he set his mind upon the conquest of Guinea, and sent every year two or three vessels to examine the coasts beyond Cape Nun, which was then the limit of exploration. Yet none of his ships for many years had the hardihood to round Cape Bojador.

The first fruit of Prince Henry's explorations was the re-discovery of Madeira and Porto Santo, in 1418 and 1420. In 1433 one of the prince's ships, commanded by Gil Eannes, at length doubled Cape Bojador. In 1435 Affonso Gonsalves Baldaya, the prince's cup-bearer, passed fifty leagues beyond the cape; and eight years afterward Nuño Tristam got to a point twenty-five miles beyond Cabe Blanco. But it was not until 1445 that the mouth of the Senegal was reached by Diniz Dias; and in those days the Portuguese gave the name of Guinea to the country commencing at Cape Nun. In 1481 the king of Portugal assumed the title of lord of Guinea. Up to 1446 there had been fifty-one caravels to the Guinea coast, and almost every year some new advance was made. Meanwhile the Canaries and Azores were brought within the realms of Spain and Portugal. In 1402 a Norman named Jean de Bethencourt, accompanied by Gadifer de la Salle, had landed on the island of Lançarote, and with reënforcements from Spain he subjugated Fortaventura and Ferro, and received the sovereignty of the Canaries from the king of Castile. But he returned to his lands in Normandy in 1406, and died there in 1425. Gomera, Palma, Teneriffe and the Great Canary were still unconquered. Prince Henry made several attempts to establish Portuguese rule on these islands; the right was long disputed with Spain; and it was not until 1479 that the treaty of Alcaçora provided for the concession of the sovereignty of the Canaries to Spain. Prince Henry, however, successfully colonized the Azores, and in 1444 St. Michael's was discovered, the settlement of the other islands following soon afterward.

In 1455 an important expedition was dispatched by Prince Henry, under the command of a young Venetian adventurer named Alvise Cadamosto. Touching at

Madeira and the Canaries, Cadamosto made his way to Cape Blanco on the African coast, and thence to Senegal and the Gambia. He returned with a full report of all he had seen, and in the following year he again sailed from Lagos direct for Cape Blanco, with three ships, and discovered the mouth of a river which he named the Rio Grande, (Jeba?) In 1457 Diogo Gomez sailed with orders to proceed as far as he could, and made his way to the Gambia. The Cape Verd Islands were discovered and colonized about 1462.

The progress of discovery for a time received a check from the death of Prince Henry, but only for a time. The results westward and eastward of the exertions of Prince Henry were the discovery of America by Columbus and of the Cape route to India by Vasco da Gama.

Christopher Columbus was born at Genoa about 1435. By 1474 his grand project of discovery was established in his mind, and nothing afterward could divert him from the pursuit of it. On the refusal of the king of Portugal to entertain his proposal, Columbus left Lisbon with his son in 1484, and he spent the interval until 1492 in appeals to the Spanish court. At length, having overcome all obstacles, he set sail with a fleet of three ships from Palos, on August 3, 1492, on his unprecedented and perilous voyage. On October 12th, having crossed the Atlantic, Columbus sighted land, which was named San Salvador. After discovering Cuba, Hispaniola, and many small islands, Columbus set sail on his return voyage on January 16, 1493, and arrived at Palos on March 15th. His reception in Spain was enthusiastic, and commensurate with the grandeur of his achievement; and on September 25, 1493 he sailed from Cadiz on his second voyage, with a fleet of three large ships and fourteen caravels. On November 3d he discovered the island of Dominica, and during the voyage his discoveries included the Windward Islands and Jamaica. He returned to Cadiz on June 11, 1496; and it was not until May 30, 1498, that he set sail on his third voyage. The first land he came to formed a new discovery, which he named the island of Trinidad, and it was in this voyage that he reached the mainland of South America, and discovered the islands of Cubagua and Margarita. On May 9, 1502, Columbus was allowed to sail on a fourth and last voyage of discovery. He reached the island of Martinique on June 13th, and touched at Dominica and Hispaniola. Thence he sailed westward, discovering the coast of Veragua and the harbor of Porto Bello. After a stay in Jamaica, he set sail for Spain on September 12, 1504, and arrived at San Lucar on November 7th. He lived for two years longer, experiencing the blackest ingratitude from the Spanish court. At length, in debt and poverty, and bowed down by disappointment, this great man died May 20, 1506. His body was buried at Valladolid, and removed in 1513, to Cartuja de las Cuevas near Seville.

While Columbus was discovering a new world, the Portuguese continued their persevering efforts to reach India by sea. Vasco da Gama sailed from Lisbon on July 8, 1497, with four vessels built expressly for the voyage, the largest not exceeding 120 tons, and called the *Sam Gabriel*. His brother Paolo commanded the *Sam Raphael*, and the *Berrio* was under Nicolas Coelho. On November 22d, with a fair wind, Da Gama rounded the Cape of Good Hope, and anchored in the bay named San Bras by Bartholomeu Dias, on the 25th. On Christmas Day he sighted land, which, on that account, he named Natal. He reached Mombas on April 7th, and on May 20, 1498, he anchored before Calicut. Da Gama returned to Lisbon in August, 1499; and at his recommendation another fleet was fitted out, consisting of thirteen



well-armed ships, under Pedro Alvarez Cabral, with Bartholomeu Dias and Nicolas Coelho under his orders. The expedition sailed on March 9, 1500; and on April 22d, Cabral discovered the coast of Brazil, and took formal possession for the king of Portugal. Resuming his voyage to the east, he reached Calicut in September, and obtained permission to build a factory, establishing friendly relations also at Cananor and Cochin. He returned to Lisbon in July, 1501. Vasco da Gama set sail, with a much larger fleet, on his second voyage in 1502. He visited several ports on the west coast of India, engaged in war as well as in commerce, and returned in September, 1503. In 1503 Antonio da Saldanha and Affonso de Albuquerque sailed for India, and made terms of friendship with the chief of Quilon. Dom Francisco de Almeida, the first viceroy of the Indies, was sent out in 1505. He founded the ports of the Angediva and Cananor, and his son Laurengo discovered Ceylon. Tristam da Cunha, with Affonso de Albuquerque under his orders, was sent to occupy Socotra, and in 1506 Albuquerque came to India as second viceroy. He explored the coasts of Arabia and Persia, made the king of Ormus tributary to Portugal, and sent embassies to Abyssinia. In 1509 (?) a factory was established at Malacca; and on November 25, 1510, the great Albuquerque conquered Goa, and established the seat of his government there. In 1512 the Moluccas were discovered; and in 1517 Fernam Peres de Andrade reached China, and entered into commercial relations with the governor of Canton. In 1524 Vasco da Gama arrived in India for a third time, as viceroy, and landed at Goa on September 11th. He died at Cochin on December 24, 1524, and in 1538 his body was transported to Portugal, and buried in his tomb at Vidigueira, of which town he was count.

The achievements of Columbus and Da Gama are immeasurably enhanced when we consider the inadequate means at their disposal, their small and ill-formed ships, and their defective knowledge of navigation. The mariner's compass had been in use for nearly two centuries, and it was Columbus himself who first observed the phenomena of variation. But the compass and rough sea-card were the only appliances, until the learned Nuremberger, Martin Behaim, invented the application of the astrolabe to purposes of navigation, which enabled mariners to ascertain their latitude. This was in the year 1480.

The discoveries of Columbus awakened a spirit of enterprise in Spain which continued in full force for a century; adventurers flocked eagerly across the Atlantic, and discovery followed discovery in rapid succession. The first map known to exist with America delineated upon it is that drawn by Juan de la Cosa, the pilot of Columbus, in his second voyage, which dated 1500.

In 1508 Ojeda obtained the government of the coast of South America from Cabo de la Vela to the Gulf of Darien; and at the same time Diego Nicuesa was appointed governor of Veragua from the Gulf of Darien to Cape Gracias a Dios. In the year 1519 Panama was founded by Pedrarias; and the conquest of Peru by Pizarro followed a few years afterward. Hernan Cortes overran and conquered Mexico from 1518 to 1521, and the discovery and conquest of Guatemala by Alvarado, of Florida by Hernando de Soto, and of Nueva Granada by Quesada, followed in rapid succession. The first detailed account of the west coast of South America was written by that keenly-observant old soldier, Pedro de Cieza de Leon, who was traveling in South America from 1533 to 1550, and published his story at Seville in 1553.

But the great anxiety of the Spanish Government at that time was to find a westward route to the Moluccas.

For this purpose Juan Diaz de Solis was dispatched in October, 1515, and in January, 1516, he discovered the mouth of the Rio de la Plata. He was, however, killed by the natives, and his ships returned. In the following year Magellan laid before Charles V., at Valladolid, a scheme for reaching the Spice Islands by sailing westward. With a fleet of five ships, and the rank of captain-general, Magellan sailed from San Lucas on September 21, 1519. After touching on the coast of Brazil, at the Rio de la Plata, and at the ports on the east coast of Patagonia, Magellan entered the straits which bear his name in October, 1520. The fleet emerged from the strait and entered the Pacific Ocean on November 27, 1520. They then steered northwest, crossed the line on February 13, 1521, and on March 6th reached the Ladrone Islands. Thence Magellan proceeded to the Philippines. He was killed in an attack on the island of Matan, which he made in order to bring it under subjection to his ally the king of Zebu, on April 26, 1521.

While the Spaniards were circumnavigating the world and completing their knowledge of the coasts of Central and South America, the Portuguese were actively engaged on similar work as regards Africa and the East Indies. In the East Indies the Portuguese acquired predominating influence at sea, establishing factories on the Malabar coast, in the Persian Gulf at Malacca, and in the Spice Islands, and extending their commercial enterprises from the Red Sea to China.

English enterprise was first aroused by John and Sebastian Cabot, father and son, who came from Venice and settled at Bristol in the time of Henry VII. The Cabots received a patent, dated March 5, 1496, empowering them to seek unknown lands; and John Cabot discovered Newfoundland and part of the coast of America. Sebastian afterward made a voyage to Rio de la Plata in the service of Spain, but he returned to England in 1548, and received a pension from Edward VI.

The French followed closely on the track of John Cabot, and the hardy Norman and Breton seamen frequented the banks of Newfoundland at the commencement of the sixteenth century. In 1524 Francis I. sent Giovanni da Verazzano of Florence on an expedition of discovery to the coast of North America; and the details of his voyage were embodied in a letter addressed by him to the king of France from Dieppe, in July, 1524. On April 20, 1534, Jacques Cartier sailed from St. Malo with two vessels of sixty tons each, for the purpose of continuing the discoveries of Verazzano, and he visited Newfoundland and the Gulf of St. Lawrence. In the following year he made another voyage, discovered the island of Anticosta, and ascended the St. Lawrence to a place called Hochelaga, now Montreal. He returned, after passing two winters in Canada; and on another occasion he also failed to establish a colony.

The reign of Elizabeth is famous for the gallant enterprises that were undertaken by sea and land to discover and bring to light the unknown parts of the earth. The great promoter and father of English geographical discovery was Richard Hakluyt, who was born near London in 1553. He was the chief promoter in the formation of the two companies for colonizing Virginia in 1606; and he devoted his life to the encouragement of similar undertakings, and to their record.

The Dutch emulated the English in the Arctic seas during this period. Their merchants opened a trade with Kola and Archangel as early as 1578, but the difficulty of penetrating into the Sea of Kara led them to try the possibility of finding a passage round the northern end of Novaya Zemlya. The credit of the conception of this voyage is due to the great cosmog-



rapher Peter Plancius, and the merchants of Amsterdam adopted the idea, and dispatched a vessel of 100 tons called the *Mercurius*, under the command of William Barents. He sailed from the Texel on June 4, 1594, and sighted Novaya Zemlya on July 4th. Sailing northward along the coast he rounded Cape Nassau and reached the edge of the ice. For many days he perseveringly sought for a passage through it. His third voyage was the most important. Heemskerk was the commander, Barents was pilot, and the mate, Gerrit de Veer, was the historian of the voyage. They sailed from Amsterdam on May 13, 1596. On June 19th, Spitzbergen was discovered, and the whole western coast and part of the northern examined.

In 1577 Francis Drake, who had previously served with Hawkins in the West Indies, undertook his celebrated voyage round the world. His fleet consisted of three ships and two pinnaces, which were broken up during the voyage. The ships were the *Pelican* of one hundred tons, on board of which Drake himself embarked, the *Elizabeth* of eighty, and the *Marigold* of thirty tons. After some stay at Port San Julian on the coast of Patagonia, the fleet entered the Straits of Magellan on August 20, 1578, when Drake changed the name of his ship to the *Golden Hind*. They reached the western entrance on September 6th, and soon afterward the *Marigold* parted company in a gale of wind, and was never heard of again, while the *Elizabeth* basely deserted her consort and returned to England. Drake, in the *Golden Hind*, continued the voyage alone. At first he was driven to the southernmost point of Tierra del Fuego, and thus discovered that there was a passage, though he did not round Cape Horn. He then proceeded northward along the west coast of America, touching at the island of Mocha off the Chilian coast, at Valparaiso, Coquimbo, Tarapaca, Arica, Callao, and Payta. Off Cape San Francisco, nearly on the equator, he captured a very rich Spanish treasure-ship called the *Cacafuego*; and it is right to observe that England was then at peace with Spain. Drake resolved to attempt the discovery of a passage from the Pacific to the Atlantic, and with this object he continued to shape a course northward along the American continent. On June 5, 1579, the *Golden Hind* reached her most northern point in  $48^{\circ}$ , when the attempt was abandoned, and Drake put into a harbor to refit, named Port Drake, which appears to have been the modern harbor of San Francisco, on the coast of California. The coast from the southern extremity of the Californian peninsula to Cape Mendocino was discovered by Juan Rodriguez Cabrillo and Francisco de Ulloa in 1539. Drake's discoveries extend from Cape Mendocino to  $48^{\circ}$  north.

Leaving California, Drake sailed across the Pacific and reached the Philippine Islands in October. He touched at Ternate and Java, and rounded the Cape of Good Hope on June 15, 1580. The *Golden Hind* anchored safely at Plymouth on September 26th, following. Drake was graciously received and knighted by the queen, and the *Golden Hind*, the first English ship that circumnavigated the globe, was preserved for many years at Deptford.

The exploring enterprise of the Spanish nation did not wane after the conquest of Peru and Mexico, and the acquisition of the vast empire of the Indies. It was rather spurred into renewed activity by the audacity of Sir John Hawkins in the West Indies, and by the appearance of Drake, Cavendish, and Richard Hawkins in the Pacific.

The Portuguese, in the early part of the seventeenth century (1578-1640), were under the dominion of Spain, and their enterprise was to some extent damped; but

their missionaries extended geographical knowledge in Africa.

But the attention of the Portuguese was mainly devoted to vain attempts to maintain their monopoly of the trade of India against the powerful rivalry of the English and Dutch. The English enterprises were persevering, continuous, and successful.

The Dutch nation, as soon as it was emancipated from Spanish tyranny, displayed an amount of enterprise which, for a long time, was fully equal to that of England. The memorable Arctic voyages of Barents were quickly followed by the establishment of a Dutch East India Company; and Holland, ousting the Portuguese, not only established factories on the mainland of India and in Japan, but acquired a preponderating influence throughout the Eastern Archipelago.

The Dutch were resolved to discover a passage into the Pacific to the south of Tierra del Fuego, the existence of which was ascertained by Sir Francis Drake. The vessels fitted out for this purpose were the *Eendracht* of 360 tons, commanded by Jacob le Maire, and the *Horn*, of 110 tons, under Jan Schouten. They sailed from the Texel on June 14, 1615, and by January 20, 1616, they were south of the entrance of Magellan's Straits. Passing through the strait of Le Maire they came to the southern extremity of Tierra del Fuego, which was named Cape Horn, in honor of the town of Horn in West Friesland, of which Schouten was a native. They passed the cape on January 31st, encountering the usual westerly winds. The great merit of this discovery of a second passage into the South Sea lies in the fact that it was not accidental or unforeseen, but was due to the sagacity of those who designed the voyage. On March 1st the Dutch fleet sighted the island of Juan Fernandez; and, having crossed the Pacific, the explorers sailed along the north coast of New Guinea, and arrived at the Moluccas on September 17, 1616. In 1623, the Dutch sent expeditions against Brazil and Peru, which, however, did little to advance geographical knowledge, except that the Brazilian invasion resulted in the valuable work of Nieuhof.

There were several early indications of the existence of the great Australian continent, which have been very ably discussed by Mr. Major; and the Hollanders endeavored to obtain further knowledge concerning the country and its extent; but only its northern and western coasts had been visited before the time of Governor Van Diemen. Dirk Hartog had been on the west coast in latitude  $26^{\circ} 30'$  south, in 1616. Pelsert struck on a reef called "Houtman's Abrolhos" on June 4, 1629. In 1697 the Dutch captain Vlamingh landed on the west coast of Australia in  $31^{\circ} 43'$  south, and named the Swan River, where he saw some black swans. In 1642 the governor and council of Batavia fitted out two ships to prosecute the discovery of the south land, and intrusted the command to Captain Abel Jansen Tasman. This voyage proved to be the most important to geography that had been undertaken since the first circumnavigation of the globe. Tasman sailed from Batavia in the yacht *Heemskirk* on August 14, 1642, and from Mauritius on October 8th. On November 24th high land was sighted in  $42^{\circ} 30'$  south, which was named Van Diemen's Land, and, after landing there, sail was again made, and New Zealand (at first called Staten Land) was discovered on December 14th. Tasman communicated with the natives and anchored in what he called Murderer's Bay. From New Zealand it was resolved to steer north and then eastward to longitude  $140^{\circ}$  E. On this course the ships arrived at Tongatabu, one of the Friendly Islands of Cook; in April, 1643, they were off



the north coast of New Guinea; and on June 15th Tasman returned to Batavia. In 1644 Tasman made a second voyage to effect a more full discovery of New Guinea.

The French directed their enterprise more in the direction of North America than of the Indies. One of their most distinguished naval worthies was Samuel Champlain, a native of Brouage in Saintonge. He died toward the end of the year 1635. Champlain was an able navigator and a resolute explorer, and he made a very large addition to the knowledge of Canada and Acadia (Nova Scotia).

The last expedition of the seventeenth century was purely scientific. In 1699 Edmund Halley, the astronomer-royal, in command of the *Paramour Pink*, undertook a voyage to improve the knowledge of longitude, and of the variation of the compass. The results of his voyage were the construction of a variation chart, and proposals for finding the longitude by occultations of fixed stars.

During the seventeenth century very considerable progress was made in the art of navigation, and in systematizing and delineating the vast mass of material that was accumulated by the ceaseless activity of explorers. The Dutch took the lead as map-makers. Mercator invented the useful projection which bears his name; and Ortelius, Hondius, and Hulsius compiled a series of valuable maps. In finding the latitude at sea, the astrolabe very generally gave place to the cross-staff, because the graduation of the latter was larger and more easily read off. The cross-staff was a very simple instrument, consisting of a graduated pole with cross pieces, called transversaries (of which there were four used according to the altitude), also graduated, which were fitted to work on it. The bearings of the sun were taken by compass to ascertain when it was near the meridian; then the end of the long staff was placed close to the observer's eye, and the transversary moved until one end exactly touched the horizon and the other the sun's center. This was continued until the sun dipped, when the meridian altitude was obtained. The back-staff was an improvement on the cross-staff, invented by the great Arctic navigator, John Davis. It was fitted with a reflector, and it was thus the first rough idea of the principle of the quadrant and sextant. The cross-staff was used for low altitudes, because both ends of the transversary could easily be seen at the same time, and the astrolabe for high altitudes. With the invention of these instruments came instructions for their use, and for working out observations. In England the first of these was *The Old Rutter of the Sea*, printed in 1490. Then followed the *Seaman's Secrets* of John Davis, and *A Regimen of the Sea, containing very necessary Matters, with a perfect Sea Card*, by Thomas Hood, published in 1596. Hood also sold compasses constructed on Mr. Norman's principle, near the Minories. These manuals contained definitions, treatises on the use of the sea card and compass, tables of declination and rules for applying them, rules for dead reckonings and longitude, and instructions in the use of instruments. Latitude was obtained by observation, but longitude had usually to be reckoned on the chart from the meridian of Grand Canary, which in those days was used by all civilized countries. The differences of time between the eclipses of the moon at the place of the observer and the place for which it was calculated in the *ephemerides* for that day was another method in use of finding the difference of longitude. Mariners were also provided with tables giving the number of miles in a degree of longitude for every degree of latitude. Much attention was bestowed upon phenomena of the variation and dip of the magnetic

needle. Robert Norman, the hydrographer, discovered the dip or inclination of the needle in 1576, and in 1581 he observed the variation of the compass at London, and found it to be  $11^{\circ} 15'$  E. In the same year his *Discourse of the Magnet or Loadstone* was published by Ballard. In 1580 Mr. Borough, comptroller of the navy, found the variation of the compass at Limehouse to be  $11^{\circ} 19'$  E. It may be observed here that in 1657, there was no variation at London, and that it moved westerly until 1815, when it was  $24^{\circ} 27'$  W. It is now returning eastward.

By means of these rough instruments and calculations our Elizabethan navigators and their contemporaries succeeded in delineating the vast regions that were discovered. Thus the sum of human knowledge was augmented, while men's minds were enlarged, and the wealth and prosperity of nations were increased, through the provision of safe guides by which lands and seas could be traversed, and distant countries visited.

In the eighteenth century, to a far greater extent than had ever been the case before, geography began to be cultivated for its own sake, and expeditions were fitted out with the objects of discovery and of acquiring knowledge. The same objects also generally formed part of those enterprises which were avowedly undertaken for conquest, in the search of wealth, or from motives of religious zeal.

The improvement of scientific apparatus naturally went hand in hand with the progress of discovery. The great desideratum was the means of finding the longitude; and it was the creation of a commission for the discovery of longitude in 1713 which, so far as England is concerned, gave the greatest stimulus to inventions connected with geographical research. To the Board of Longitude is due the conception of the *Nautical Almanac*, and the establishment of a surveying branch of the naval service. The *Nautical Almanac* first appeared in 1767, under the auspices of Doctor Maskelyne, the astronomer-royal, who, by furnishing tables of lunar distances, supplied another means of finding the longitude. The invention by Hadley, in 1731, of the quadrant for use at sea, which entirely superseded the astrolabe and cross-staff, was a still greater improvement; and it was soon followed by better instruments on the same principle—the sextants of Dollond and Troughton. The work of travelers on land also became more accurate in proportion as instruments and maps were improved. Early explorers by land were content with itineraries and maps which only indicated distances. The introduction of observations by compass bearings was an important improvement; and after the invention of Hadley's quadrant, these rough route surveys began to be checked and verified by astronomical observations.

The most remarkable example of the early application of these improvements is to be found in the survey of China by the Jesuit missionaries.

Arabia received very careful attention, in the eighteenth century, from the Danish scientific mission, which included Carsten Niebuhr among its members. Niebuhr landed at Loheia, on the coast of Yemen, in December, 1762, and went by land to Sana. All the other members of the mission died, and he proceeded from Mocha to Bombay. He then made a journey through Persia and Syria to Constantinople, returning to Copenhagen in 1767. His invaluable work, the *Description of Arabia*, was published in 1772, and was followed in 1774-78 by two volumes of travels in Asia. The great traveler survived until 1815, when he died at the age of eighty-two. James Bruce of Kinnaird, the contemporary of Niebuhr, was equally devoted to Eastern travel. After studying Arabic and Geez for some years, he went out as consul to Algiers, and resided there



from 1762 to 1765, exploring and sketching the Roman ruins in Algiers and Tunis. In 1765 he traveled by land from Tunis to Tripoli, and then took passage for Candia, but was shipwrecked near Bengazi, and had to swim on shore. He eventually reached Candia, and, sailing thence to Sidon, traveled through Syria. In June, 1768, he landed at Alexandria in the dress of an Arab, and soon afterward we hear of him at Jiddah, the port of Mecca, in the dress of a Turkish sailor. He had resolved to attempt the discovery of the source of the Nile; and in 1769 he landed at Massowah, on the Abyssinian coast. He then penetrated to Axum and Gondar, and in November, 1770, he reached the source of the Abai, then supposed to be the main stream of the Nile. He thus attained the great object of his ambition. Returning by the desert into Egypt, Bruce reached England in 1774, and settled once more at his old home at Kinnaird after an absence of ten years. Urged by his old friend, Mr. Daines Barrington, the great traveler at length published his *Travels to Discover the Source of the Nile in the Years 1768-73* (5 vols. 4to) in 1790. Bruce, like many other conscientious and deserving explorers, was assailed by calumny and detraction. But every succeeding year has added to the high estimation in which his labors are held, and to the reverence with which his memory is cherished. He died at Kinnaird House, Stirlingshire, in 1794.

Before the death of Bruce an African Association was formed in 1788, for collecting information respecting the interior of that continent, with Major Rennell and Sir Joseph Banks as leading members, and Bryan Edwards as secretary. The association first employed a Mr. Ledyard to cross Africa from east to west on the parallel of the Niger, and Mr. Lucas to cross the Sahara to Fezzan. Ledyard, who had previously made a most extraordinary journey into Siberia, died at Cairo in 1788. Lucas went from Tripoli to Mesurata, obtained some information respecting Fezzan, and returned in 1789. One of the chief problems the Association wished to solve was that of the existence and course of the river Niger, which Maxwell believed to be identical with the Congo. Mungo Park, then an assistant surgeon of an Indiaman, volunteered his services, which were accepted by the Association, and in 1795 he arrived at the English factory of Pisania; 200 miles up the Gambia. Leaving this station in December he reached Ludamar, where a Moorish chief imprisoned him until the following July. He then crossed a mountainous tract to a Mandingo town called Kamalia. Quite destitute, and suffering from fever, he remained there for several months, but finally found his way back to Pisania, and returned to England. Five years afterward he accepted an offer from the government to command an expedition into the interior of Africa, the plan being to cross from the Gambia to the Niger, and descend the latter river to the sea. Park left the factory of Pisania, on the Gambia, on May 4, 1805, accompanied by Lieutenant Martyn and thirty-five soldiers, besides guides. All died but four during the rainy season, and the rest, including Mungo Park, perished in a rapid on the Niger, having been attacked from the shore by order of a chief who thought that he had not received suitable presents. Park was only thirty-five at the time of his death. The details respecting the fate of the ill-fated explorer and his party were obtained from the guide.

While the English were at work in the direction of the Niger, the Portuguese were not unmindful of their old exploring fame. In 1798 Doctor Lacerda, an accomplished astronomer, was appointed to command a scientific expedition of discovery to the north of the Zambesi. He started in July, crossed the Muchenja Mountains, and reached the capital of the Cazembe,

where he died of fever. Doctor Lacerda left a valuable record of his adventurous journey; but with Mungo Park and Lacerda the history of African exploration in the eighteenth century closes.

In South America scientific exploration was busily at work during this period. The great event of the century, as regards that continent, was the measurement of an arc of the meridian. The undertaking was proposed by the French Academy, and a commission left Paris in 1735, consisting of La Condamine, Bouguer, and Godin. Spain appointed two accomplished naval officers, the brothers Ulloa, as coadjutors. The operations were carried on during eight years on a plain to the south of Quito; and, in addition to his memoir on this memorable and most important measurement, La Condamine collected much valuable geographical information during a voyage down the Amazon. The arc measured  $3^{\circ} 7' 3''$  in length; and the work consisted of two measured bases connected by a series of triangles, one north and the other south of the equator, on the meridian of Quito. Contemporaneously, in 1738, M. Maupertuis of St. Malo measured an arc of the meridian in Lapland. Another result of this expedition was the publication of a valuable work by the brothers Ulloa.

The English and French Governments dispatched several expeditions of discovery into the Pacific and round the world during the eighteenth century. They were preceded by those wonderful and romantic voyages of the buccaneers, of such men as Woodes Rogers, Davis, Shelvocke, Clapperton, and Dampier, which can never fail to interest, while they are not without geographical value. The works of Dampier are especially valuable, and the narratives of William Funnell and Lionel Wafer furnished the best accounts then extant of the isthmus of Darien. Dampier's literary ability eventually secured for him a commission in the king's service; and he was sent on a voyage of discovery, during which he explored part of the coasts of Australia and New Guinea, and discovered the strait which bears his name between New Guinea and New Britain, returning in 1701. In 1721 Jacob Roggewein was dispatched on a voyage of some importance across the Pacific by the Dutch West India Company, during which he discovered Easter Island on April 6, 1722.

The voyage of Lord Anson to the Pacific in 1740-44 was of a predatory character, and he lost more than half his men from scurvy; while it is not pleasant to reflect that at the very time when the French and Spaniards were measuring an arc of the meridian at Quito, the English under Anson were pillaging along the coast of the Pacific, and burning the town of Payta. But a romantic interest attaches to the wreck of the *Wager*, one of Anson's fleet, on a desert island near Chiloe, for it bore fruit in the charming narrative of Byron, which will endure for all time. In 1764 Captain Byron himself was sent on a voyage of discovery round the world, which led, immediately after his return, to the dispatch of another to complete his work, under the command of Captain Wallis.

The expedition, consisting of the *Dolphin* commanded by Captain Wallis, and the *Swallow* under Captain Carteret, sailed in September, 1766, but the ships were separated on entering the Pacific from the Straits of Magellan. Wallis discovered Tahiti on June 19, 1767, of which island he gave a detailed account, and Sir Charles Saunders' Island; he returned to England on May 17, 1768. Carteret discovered the Charlotte and Gloucester Islands, and Pitcairn Island on July 2, 1767; revisited the Santa Cruz group, which was discovered by Mendaña and Quiros; and discovered the strait separating New Britain from New Ireland. He reached Spithead again on February 20, 1769. Wallis and Carteret were followed very closely by the French expedition of Bou-



gainville, which sailed from Nantes in November, 1776. Bougainville had first to perform to him the unpleasant task of delivering up the Falkland Islands (Malouines), where he had encouraged the formation of a French settlement, to the Spaniards. He then entered the Pacific, and reached Tahiti on April 2, 1768. Passing through the New Hebrides group he touched at Batavia, and arrived at St. Malo after an absence of two years and four months.

The three voyages of Cook form an era in the history of geographical discovery. All his work was thoroughly and completely done. He systematically surveyed every land he discovered, collecting information touching every branch of inquiry, so that his labors form a very large addition to geographical knowledge.

In 1785 the French Government fitted out a very carefully-prepared expedition of discovery at Brest, which was placed under the command of La Perouse, an accomplished and experienced officer. After touching at Concepcion, in Chili, and at Easter Island, La Perouse proceeded to the Sandwich Islands, and thence to the coast of California, of which he has given a very interesting account. He then went across the Pacific to Macao, and in July, 1787, he proceeded to explore the Gulf of Tartary and the shores of Saghalien, remaining some time at Castries Bay, so named after the French minister of marine. Thence he went to the Kurile Islands and Kamchatka, and sailed from the far north down a meridian to the Navigator and Friendly Islands. He was in Botany Bay in January, 1788; and sailing thence, the explorer, his ship, and crew were never seen again. Their fate was long uncertain. In September, 1791, Captain D'Entrecasteaux sailed from Brest with two vessels, to seek for tidings. He visited the New Hebrides, Santa Cruz, New Caledonia, and Solomon Islands, and made careful though rough surveys of the Louisiade Archipelago, islands north of New Britain, and part of New Guinea. D'Entrecasteaux died on board his ship on July 20, 1793, without ascertaining the fate of La Perouse. It was Captain Peter Dillon who at length ascertained, in 1828, that the ships of La Perouse were wrecked on the island of Vanikoro during a hurricane.

The work of Captain Cook bore fruit in many ways. His master, Captain Bligh, was sent in the *Bounty* to convey breadfruit plants from Tahiti to the West Indies. He reached Tahiti in October, 1788, and in April 1789 a mutiny broke out, and he, with several officers and men, was thrust into an open boat in mid-ocean. During the remarkable voyage he then made to Timor, Captain Bligh passed among the northern islands of the New Hebrides, which he named the Banks Group, and made several running surveys. He reached England in March, 1790. The *Pandora*, under Captain Edwards, was sent out in search of the *Bounty*, and discovered the islands of Cherry and Mitre, east of the Santa Cruz group, but she was eventually lost on a reef in Torres Strait. In 1796-97 Captain Wilson, in the missionary ship *Duff*, discovered the Gambier and other islands, and rediscovered the islands known to and seen by Quiros, but since called the Duff Group. Another result of Captain Cook's work was the colonization of Australia. On January 18, 1788, Admiral Phillip and Captain Hunter arrived in Botany Bay in the *Supply* and *Sirius*, followed by six transports, and established a colony at Port Jackson. Surveys were then undertaken in several directions. In 1795 and 1796 M. Flinders and G. Bass were engaged on exploring work in a small boat called the *Tom Thumb*. In 1797 Bass, who had been a surgeon, made an expedition southward, continued the work of Cook from Ram Head, and explored the strait

which bears his name, and in 1798 he and Flinders were surveying the east coast of Van Diemen's Land. The planting of a colony at Port Jackson led to the dispatch of an expedition to complete the exploration of the Australian coasts. The command was given to Capt. Matthew Flinders. He was furnished with a vessel called the *Investigator*, and sailed from England on July 18, 1801. Commencing from King George's Sound, Captain Flinders discovered and made a preliminary survey of all the south coast of Australia to Bass Strait, and the east coast from the barrier reef to Torres Strait, as well as the east coast of the Gulf of Carpentaria. Flinders met the French expedition under Baudin and Freycinet with two ships *Géographe* and *Naturaliste*, which was engaged upon the same work. He was taken prisoner by the French in 1804 and detained until 1810, so that his work did not appear before 1814.

In February, 1773, the Royal Society submitted a proposal to the king for an expedition to try how far navigation was possible toward the Pole. The *Racehorse* and *Carcase* bombs were selected as best adapted for the service, and Captains Phipps and Lutwidge were appointed to command them. The expedition sailed on June 2, 1773, and sighted the coast of Spitzbergen on the 28th. Captain Phipps stood into every opening he could find in the ice, but was invariably stopped by a solid barrier. He examined a line extending over twenty degrees of longitude, and found no opening in the heavy polar pack in any direction. After a very careful and persevering examination of the ice, the expedition returned to England in September. The highest latitude reached was  $80^{\circ} 48' N$ . But the most important Arctic work in the eighteenth century was performed by the Russians, for they succeeded in delineating the whole of the northern coast of Siberia. Some of this work, indeed, was done at a still earlier date.

The eighteenth century saw great progress in the collection and arrangement of geographical material, and in the work of surveying and map-making.

Toward the close of the century it was recognized that geography served more extensive and important uses than had ever before been supposed. The route survey was sufficient for the traveler or soldier, while accurate charts guided the mariner across the ocean. But surveys are also the basis of statistics and of administration, and rigorous accuracy became necessary. Surveys on a trigonometrical basis, which have been proceeding in all the countries in Europe (except Turkey) and in India during the present, were commenced in the last century. In Great Britain the Ordnance Survey was begun in April, 1784, when General Roy measured a base line on Hounslow Heath. The triangulation of the British Isles was commenced in 1784 and completed in 1852. Maps based on trigonometrical surveys may eventually explain and illustrate the physical aspect of the whole globe, but at present they are necessarily confined to those nations which are in the front rank of civilization. Countries which are not so advanced are still obliged to be content with such maps as sufficed for all the world in the last century, before the results of trigonometrical surveys were available.

South America had produced two eminent physical geographers, namely, Caldas of Bogota and Unanue of Lima, before the scenery of the Orinoco and the Andes became familiar to Europe through the charming narratives of Humboldt. It was in 1799 that the great Prussian naturalist embarked at Coruña, and landed at Cumana on the coast of Venezuela. His observant eye and bright imagination, combined with habits of scientific thought, produced pictures of the physical aspects of the region he explored which are quite unequalled.



The greatest and most important enterprise, after the peace of 1815, was the renewal of Arctic exploration under the auspices of Sir John Barrow.

The Russians, as well as the French, sent several voyages into the Pacific during the first half of the nineteenth century. In 1804 Admiral Krusenstern made a voyage round the world, and his pupil, Otto von Kotzebue, son of the dramatist, commanded the "Rurick" from 1815 to 1818 on a voyage of discovery. He discovered the great bay known as Kotzebue Sound, sounded in Behring Strait, and made careful observations of the currents. Wintering in California he returned to the Aleutian Islands in the following spring; and during the voyage homeward he discovered several new islands in the Pacific, especially Romanzoff and Krusenstern in the Dangerous Archipelago. During another Russian voyage, commanded by Billingshausen, Lazareff and other coral islands in the Dangerous Archipelago were discovered, and in 1828 Captain Lutke, in the *Seniavine*, surveyed the Caroline group. Captain Freycinet, the officer who served with Baudin and edited his work, also examined the Caroline Islands in the *Uranie* in 1819, but his voyage was mainly in the interests of natural history. Duperry in 1822-23 did some surveying work on the coast of New Ireland. But the most important French voyage was the Dumont D'Urville, who was sent out to seek for traces of La Perouse in 1828. He visited Tecopia and other islands in the *Astrolabe*, and was nearly a month at Vanikoro collecting relics of the ill-fated expedition. The voyage of D'Urville contributed largely to the advancement of science, and resulted in the publication of a magnificent work in 1830.

The only English scientific voyage to the Pacific in this period was sent out mainly to coöperate with Parry in his third voyage, and Franklin in his second journey. It was commanded by Captain Beechey, who had been first lieutenant with Parry during his first Arctic voyage, and on May 19, 1825, he sailed from Spithead in her majesty's ship *Blossom*. After visiting Easter, Gambia, Pitcairn and other islands, the *Blossom* arrived at Honolulu on May 20, 1826, and in July she was in Behring Strait, entering Kotzebue Sound on the 22d. Proceeding along the north coast of America, the ship's barge got to a low cape called Point Barrow, at the very time when Franklin and Back were at Return Reef. The accurate examination of the coast was made under circumstances which demanded great fortitude and perseverance, and reflects credit on the officers and crew. The *Blossom* returned to Honolulu in January, 1827, and arrived at Macao on the 12th of April. Captain Beechey next proceeded to survey the Loo Choo and Bonin Islands, and, after another visit to the far north, and the coasts of California and Mexico, he returned home by Cape Horn and arrived at Woolwich on October 12, 1828. His valuable and interesting narrative, in two volumes, was published in 1831. Mr. James Weddell, a master in the navy, made a voyage to the Antarctic Ocean in 1822-24, and went as far south as 74°.

The Royal Geographical Society was founded in 1830, and forms a landmark in the history of discovery. A similar society in Paris preceded that of London in point of time, and now every civilized country has established a Geographical Society.

Geographical discoverers of the nineteenth century have had a great work to do in Africa. D'Anville and his successors cleared off all that was uncertain on the map, all that had come from the information given by Duarte Lopez to Pigafetta, and from Leo Africanus, and left a great blank. James Bruce and Mungo Park, Clapperton and Tuckey merely touched the edges or

penetrated in single lines across the vast unknown area. But they have been followed by many others, and now great progress has been made. In 1831 Monteiro and Gamitta were sent by the Portuguese Government, in the footsteps of La Cerda, to the capital of Cazembe; while, in 1849 and 1843-47, Ladislaus Magyar and Graça explored some of the southern affluents of the Congo. Rüppell (1838), Harris (1843), and Dr. Beke (1840), Lefebvre and Dillon (1839-43), Ferret and Galinier (1847) improved the existing knowledge of Abyssinia, to which a further important contribution was made by the expeditionary field force sent in 1867-68 to enforce the release of English captives; and progress was made, under the auspices of the Egyptian Government, in exploring the White Nile above Khartoum. In 1849 the discoveries of Denham and Clapperton were followed up by Richardson, Overweg, and Barth, who, like their predecessors, went from Tripoli to Mourzouk, the capital of Fezzan. The two first died in Africa, but Dr. Barth returned home with a rich harvest of results. He reached Kouka, the capital of Bornou, on Lake Tchad, and in 1851 he visited the south side of that lake, and advanced some distance to the eastward. In 1852 he was at Saccatoo, where Clapperton died, whence he crossed the Niger and eventually reached Timbuctoo. After a stay of some months Dr. Barth left Timbuctoo in March, 1854, and got back to Tripoli in the end of 1855, being the sole survivor of his party. Dr. Vogel, in 1853-57, followed up the discoveries in the direction of Lake Tchad, and fell a victim to science; and the researches of Dr. Baikie in 1854 supplemented the work of the Landers in the lower part of the course of the Niger. Dr. Baikie also explored 250 miles of the river Chadda or Benue.

On the eastern coast of Africa, the missionaries Rebmann and Krapf ascertained the existence of the snowy peaks of Kenia and Kilimanjaro near the equator, and collected reports touching the equatorial lakes in the interior. This led to the expedition of Captain Burton in 1857, who, accompanied by Captain Speke, landed opposite to Zanzibar, and, advancing westward, discovered Lake Tanganyika. Captain Burton's admirable description of the region between the coast and the great lake he had discovered is one of the most valuable contributions to African descriptive geography. His companion, Captain Speke, made an excursion northward to the southern coast of a lake which he judged to be a main source of the Nile. In this belief he again set out in 1860 to attempt the achievement of a journey from Bagamoyo, opposite Zanzibar, to the Nile. This great enterprise was crowned with success. Speke traced out the western shore, and visited the northern outlet, of the Victoria Nyanza, the main reservoir of the White Nile. He then marched northward to Gondokoro, and descended the Nile. He had heard of a second great Nile reservoir, which Sir Samuel Baker discovered in 1864, and named the Albert Nyanza. The Bahr el Ghazel and other western feeders of the Nile were visited by Consul Petherick, and explored in 1868-71 by Doctor Schweinfurth, whose work ranks with that of Burton as a record of African discovery.

The travels of Doctor Livingstone in Southern Africa also added considerably to our knowledge of the geography of that continent. In 1848 he started from Cape Colony, visited Lake Ngami in 1849, and eventually reached the Portuguese town of St. Paul Loanda in 1855. Thence he marched across the continent, discovering the great falls and a considerable part of the course of the Zambesi. In his second expedition he proceeded up the Zambesi and its tributary the Shire, and discovered the Lake Nyassa. On his third and last expedition



he landed on the east coast at the mouth of the Rovuma, and made his way thence to Lake Nyassa. The great traveler then followed in the footsteps of Doctor Lacerda and Monteiro to the Cazembe's capital, and thence to Lake Tanganyika. From Ujiji, on that lake, he made his way westward to the river Lualaba (the upper course of the Congo), returning in a destitute condition to Ujiji; he was there succored by Mr. Stanley. Finally he once more started, and died in the midst of his discoveries among the remoter sources of the Congo. Lieutenant Cameron's expedition in 1873 had for its main object the succor of Livingstone, but the news of the great traveler's death was received at Unyanyembe. Cameron then continued his march by a new route to Ujiji, and completed the survey of the southern half of Lake Tanganyika, discovering the Lukuga outlet. Thence he advanced westward across the Manyema country to Livingstone's furthest point at Nyangwe, crossed the Lualaba, and traversed the whole width of the African continent, reaching St. Paul Loanda on the west coast. Mr. Stanley followed in 1874. He circumnavigated and fixed the outline of the Victoria Nyanza, followed Cameron across Lake Tanganyika to Nyangwe, and then descended the great River Congo, discovering its course, and connecting the work of Livingstone with that of Tuckey. Mr. Young has since completed the survey of Lake Nyassa; Nachtigal has supplemented the work of Barth and Vogel in the Tchad region; while Duveyrier and other French explorers have examined the region of the Sahara. In the far south the Limpopo basin, and the country intervening between the Limpopo and Zambesi, have been made known to us by St. Vincent Erskine and Elton, Carl Mauch and Baines. In 1887 Mr. Stanley again started upon another expedition into Central Africa, the main object of which was to relieve Emin Pasha. He discovered Emin at Lake Nyanza on April 29, 1888. He announced as the chief feature of his geographical discoveries the establishment of the fact of the existence in the hitherto unsuspected portion of Africa of a lofty range of mountains—the old supposedly fabulous "Mountains of the Moon"—which are covered with perpetual snow. From these mountains the western branch of the Upper Nile rises. In addition to this many other streams have birth here, which feed the Sembiki river, in its turn emptying in Albert Nyanza—from which issues the true or Lower Nile. Into this lake the eastern branch of the Upper Nile also empties itself. This discovery has given rise to many speculations, the answers to which cannot as yet be given; and also has proven that the ancient travelers, who have been for so many ages derided for their accounts of snowy mountains in equatorial Africa, were not so wide of the mark as had been supposed. Thus the extent of the unknown parts of Africa has been rapidly curtailed, while our knowledge has been widened during the last half-century.

On the American continent scientific progress has been made in the United States and the dominion of Canada, where, within the last half-century, boundary commissions and surveys have fixed positions and described previously unknown regions of great extent. In South America there are vast unexplored regions to the eastward of the Andes, and in the basins of the great rivers. Sir Robert Schomburgk did much valuable work in Guiana, and explored the delta of the Orinoco in 1841; while Spix and Martius, Poeppig and Castelnau, Maw and Smyth, Herndon and Gibbon, Spruce and Bates, Wallace and Chandless, and others, explored the basin of the Amazon. The labors of Pissis in Chili, of Raimondi and Werthermann in Peru, of Codazzi in Colombia and Venezuela, and of Morales

and others in the Argentine Republic, have been most valuable to geographical science. In Patagonia, Fitz Roy and King explored the Santa Cruz river, Cox and Morales have since added to our knowledge, and Commander Musters, R.N., was the first traveler who traversed the whole of Patagonia from south to north, 960 miles of latitude, of which 780 were previously unknown to Europeans.

The difficulty of exploring the interior of the Australian continent was caused by the scarcity of water, and the immense distances it was necessary to cross without supplies of any kind. Hence the work of exploration has required and called forth high and noble qualities in a degree quite equal to any that have been recorded in any other part of the world. The names of Sturt and Leichhardt, of Eyre and Grey, of Macdougall Stewart and Burke, of Gregory, of Forrest and Warburton, will be handed down as those of intrepid and courageous explorers who laid open the secrets of the interior of Australia.

The Pacific Ocean was explored by numerous expeditions during the eighteenth and early part of the nineteenth centuries. Still much remained to be done in the way of verification and more complete survey. From 1826 to 1836 Captain Fitzroy, with the naturalist Darwin, surveyed Magellan's Strait and the west coast of South America; and further important surveys in the Pacific were afterward executed by Captain Wilkes of the United States Navy, and by Belcher, Kellett, and Denham.

But the great geographical work of the present century must be the extension of discovery in the Arctic and Antarctic regions. Progress has been made in both directions, and in both much remains to be done. It is this polar work which calls forth the highest qualities of an explorer; it is here that the greatest difficulties must be overcome; and it is here that the most valuable scientific results are to be obtained.

There is one great branch of physical geography which has only been effectively studied within the last thirty years, namely, the physical geography of the sea. Matthew Fontaine Maury, by his wind and current charts, by his trade wind, storm, rain, and whale charts, and above all by his charming work *The Physical Geography of the Sea*, gave the first impulse to this study. It was Captain Maury who organized the first deep-sea soundings in the North Atlantic, which up to that time was deemed to be unfathomable; and when his work was published, the illustrious Humboldt declared Maury to be the founder of a new and important science—the meteorology of the sea. He first took charge of the Washington Observatory in 1842; he resigned that post under a deep sense of duty in April, 1861, after a career of great usefulness; and he ended a noble and well-spent life in 1872. The investigations into the physical geography of the sea, which were combined into a system by Maury, have since been ably and zealously continued by others, among whom the names of Doctor Carpenter, Sir Wyville Thomson, and Professor Mohn of Christiania are preëminent. The voyage of the *Challenger* from 1873–1876, under Captains Nares and Thomson, with Sir Wyville Thompson as chief of the scientific staff, was organized with the object of examining and mapping the bottom of the ocean, of describing the fauna of the great depths, of ascertaining the temperatures at various depths, and of solving questions relating to oceanic circulation. The area thus explored in the Atlantic, Antarctic, Pacific, and Indian Oceans is of vast extent, and the researches, ably and zealously conducted, have resulted in an important addition to geographical knowledge.

In this rapid sketch of the history of geographical dis-



covery, the labors of numerous explorers during many generations have been enumerated; but its perusal will show that, notwithstanding all this work, there is much remaining to be done. Vast areas round both poles, and in the interior of Asia, Africa, South America, and New Guinea, are still unknown, even more extensive regions have only been partially explored, and millions of square miles remain to be surveyed, before the work of geographers is complete.

#### MATHEMATICAL GEOGRAPHY.

All our knowledge of the planet on which we live, whether obtained from the explorations of travelers, the voyages of navigators, or the discoveries of astronomers in modern times, goes to confirm the doctrine held and taught by philosophers in a remote antiquity that the earth is spherical. What is spherical, however, is not the actual surface of the earth, but rather that of the sea, produced in imagination to pass through the continents. That the surface of the sea is convex, any one may—at a seaside station where there is a high cliff—convince himself, by noting with a telescope at the top of the cliff the exact appearance of a ship in, or slightly beyond, the horizon, and then, immediately after, repeating, at the foot of the cliff, the same observation on the same ship. By a more precise observation of the sea horizon from a known altitude one may even calculate the radius of the earth.

The first great fact in the description of the earth being that it is spherical (or at any rate so nearly so that, were a perfect model of it constructed, no one could, by unaided vision, discover that it is not spherical), the next points to be noted are—secondly, that the earth rotates uniformly round an axis passing through its center, and fixed, or very nearly fixed as to direction, in space; and, thirdly, that its figure is not spherical, but spheroidal, the surface being that found by the revolution of an ellipse round its minor axis, the axis of figure corresponding with the axis of diurnal rotation. The spheroidal figure is a necessary consequence of the rotation. The rotation of the earth in twenty four hours is made evident by the rising and setting of the heavenly bodies.

The poles of the earth are the points in which the axis of rotation, or of figure, meet the surface; and the equator is the circle in which the surface is intersected by a plane through the earth's center, perpendicular to the axis of rotation. Every point of the equator is therefore equidistant from the poles.

To determine the position of a point in space three coördinates or measurements are necessary; they may be three lines, or two lines and one angle, or two angles and one line. Thus, to define the precise position of a point on the earth's surface, we express it by latitude, longitude and altitude; the first two are angular measures, the third a linear magnitude, namely, the height above the surface of the sea.

The line in which the surface of the earth is intersected by a plane through the axis of rotation is called a meridian, and all meridians are evidently similar curves. A line perpendicular to the surface at any point is called a vertical line; it corresponds with the direction of gravity there; being produced outward, that is, away from the earth's center, it meets the heavens in the *zenith*; and produced downward it intersects the axis of revolution; it would, of course, pass through the earth's center were it a sphere; as it is, it passes *near* the earth's center.

The angle between the meridian planes of two stations as A and B is called the difference of longitude of A and B, or the longitude of B with reference to A. In British maps the longitudes of all places are expressed with reference to the Royal Observatory of Greenwich.

In America, Washington is the initial point, while the Portuguese formerly reckoned from the Azores, which they considered the end of the earth.

The latitude of any point is the angle made by the vertical line there with the plane of the equator, or the co-latitude in the angle between the vertical line and the axis of rotation. The surface of the earth being one of revolution, any intersecting plane parallel to the equator cuts it in a circle. If we imagine the vertical lines drawn at any two points, as P and Q, in such a circle, it is evident from the symmetry of the surface that these verticals make the same angle with the equator; in other words, the latitudes of all points on this circle are equal. Such circles are called parallels; they intersect meridians at right angles.

If we suppose that at any point Q of the surface the meridian, or a small bit of it, is actually traced on the surface, and also a portion of the parallel through the same point, then these lines, crossing at right angles in Q, mark there the directions which we call north and south, east and west—the meridian lying north and south, the parallel east and west. Planes containing the vertical line at Q are vertical planes there. A vertical plane is defined by its azimuth, which is the angle it makes with the meridian plane; the azimuth at Q of any object (or point) celestial or terrestrial is the right angle which the vertical plane passing through the object makes with the meridian. The south meridian is generally taken as the zero of azimuth. The plane touching the surface at Q is the visible horizon there—a plane parallel to this through the center of the earth being called the rational horizon. The altitude at Q of a heavenly body, as a star, is the angle which the line drawn from Q to the star makes with the plane of the horizon—the zenith distance of the same star being the angle between its direction and the vertical at Q.

By a degree of the meridian is meant this: if E, F are points on the same meridian such that the directions of their verticals make with each other an angle of one degree—a ninetieth part of a right angle—then the distance between E and F measured along the meridian is a degree of the meridian. As the radius of curvature of an ellipse is variable, increasing from the extremity of the major axis to the extremity of the minor axis, so on the earth's surface a degree of the meridian is found by geodetic measurement to increase from the equator to the poles.

The actual length of a degree of the meridian at the equator is 362746.4 feet; at either pole it is 366479.8 feet. The length of one degree of the equatorial circle is 365231.1 feet.

With regard to the figure of the earth as a whole, the polar radius is 3949.79 miles, and the radius of the equator 3963.30 miles; the difference of these, called the ellipticity, is  $\frac{1}{293}$  of the mean radius. A spheroid with these semiaxes is equivalent in volume to a sphere having a radius of 3958.79 miles. Without referring further here to the spheroidal figure, we shall now, having given the precise dimensions, regard the earth as a sphere whose radius is 3959 miles. On such a sphere one degree is 69.09 miles. From the definitions given above it appears that the radius of the parallel which corresponds to all points whose latitude is  $\Phi$  is  $3959 \cos \Phi$ ; and that one degree of this circle, *i.e.*, one degree of longitude in the latitude  $\Phi$  is  $69.09 \cos \Phi$  expressed in miles.

The latitudes and longitudes of places on the earth's surface are determined by observations of the stars, of the sun, and of the moon. As the earth rotates, the zenith of any place (not being on the equator) traces out among the stars a small circle having for center that point in which the axis of rotation meets the heavens.



If there were a star at this last point it would be apparently motionless, having always the same altitude and azimuth. The pole star, though very conveniently near the north pole of the heavens, and without perceptible motion to the unaided eye, is in reality moving in a very small circle. The zenith of a point on the equator traces out in the heavens a great circle, namely, the celestial equator.

As the positions of points on the earth are defined with reference to the equator and a certain fixed meridian, so the positions of stars are defined by their angular distance from the celestial equator, called in this case declination, and by their right ascension, which corresponds to terrestrial longitude. Stars which are on the same meridian plane (extended to the heavens) have the same right ascension. Right ascension is expressed in time from 0 h. to 24 h. A sidereal clock, going truly, indicates 24 h. for every revolution of the earth; at every observatory, the sidereal clock there shows, at each moment, the right ascension of the stars which at that moment are on the meridian. Thus the right ascension of the zenith is the sidereal time.

Observations on the sun have shown that it traces out amongst the stars in the course of a year a great circle, inclined to the equator at an angle of  $23\frac{1}{2}^{\circ}$ ; at midsummer it attains a maximum northern declination of  $23\frac{1}{2}^{\circ}$ , and at midwinter a maximum southern declination of the same amount. Hence it is inferred that the earth moves round the sun in a plane, completing one orbital revolution yearly, the axis of the earth's diurnal rotation being inclined to this plane at an angle of  $66\frac{1}{2}^{\circ}$ . Upon this angle of inclination depend the seasons, and in a great measure the climates of the different portions of the earth's surface.

It is usual to draw on globes and in maps a circle or parallel at the distance of  $23\frac{1}{2}^{\circ}$  from the equator on either side; of these circles the northern is called the Tropic of Cancer, the southern is the Tropic of Capricorn. A circle drawn with a radius of  $23\frac{1}{2}^{\circ}$  from the North Pole as center is the Arctic Circle; a similar and equal circle round the South Pole is the Antarctic Circle.

When the sun is in the equator—which it crosses from north to south in September, and from south to north in March—it is in the horizon of either pole. When the sun has northern declination, the North Pole is in constant daylight and the South Pole in darkness. When the sun has southern declination the North Pole on the contrary is in constant darkness while the South Pole is illuminated by sunshine. At midsummer in the northern hemisphere the whole region within the Arctic Circle is in constant daylight, and that within the Antarctic Circle is in darkness; at midwinter this state of things is exactly reversed. The portion of the globe lying between the Tropic of Cancer and the Arctic Circle is called the North Temperate Zone; that between the Tropic of Capricorn and the Antarctic Circle is the South Temperate Zone. In the former the sun is always to the south of the zenith; in the latter it is always to the north.

In the Torrid Zone, which lies between the Tropics, the sun, at any given place, passes the meridian to the north of the zenith for part of the year, and to the south for the remainder.

When the sun is to the north of the equator the days are longer than the nights in the northern hemisphere, while in the southern hemisphere the nights are longer than the days; when the sun has southern declination this position is reversed. As the sun increases his north declination from  $0^{\circ}$  to  $23\frac{1}{2}^{\circ}$ , not only do the days increase in length in the northern hemisphere, but the rays of the sun—in the Temperate and Arctic

regions—impinge more perpendicularly on the surface; hence the warmth of summer. Even in summer the rays of the sun in the Arctic regions strike the surface very obliquely; this, combined with the protracted season of darkness, produces excessive cold. Summer in the northern hemisphere is thus contemporaneous with winter in the southern; while winter in the northern hemisphere is simultaneous with summer in the southern.

*Construction of Maps.*—In the construction of maps, one has to consider how a portion of spherical surface, or a configuration traced on a sphere, can be represented on a plane. If the area to be represented bear a very small ratio to the whole surface of the sphere, the matter is easy: thus, for instance, there is no difficulty in making a map of a parish, for in such cases the curvature of the surface does not make itself evident. If the district is larger and reaches the size of the county, Cook County, for instance, then the curvature begins to be sensible, and one requires to consider how it is to be dealt with. The sphere not being a developable surface cannot be opened out into a plane like the cone or cylinder, consequently in a plane representation of configurations on a sphere it is impossible to retain the desired proportions of lines or areas or equality of angles. But though one cannot fulfill all the requirements of the case, we may fulfill some by sacrificing others; that is to say, we may, for instance, have in the representation exact similarity to all very small portions of the original, but at the expense of the areas, which will be quite misrepresented. Or we may retain equality of areas if we give up the idea of similarity. It is therefore usual, excepting in special cases, to steer a middle course, and, by making compromises, endeavor to obtain a representation which shall not offend the eye.

A globe gives a perfect representation of the surface of the earth; but practically, the necessary limits to its size make it impossible to represent in this manner the details of countries. A globe of the ordinary dimensions serves scarcely any other purpose than to convey a clear conception of the earth's surface as a whole, exhibiting the figure, extent, position, and general features of the continents and islands, with the intervening oceans and seas; and for this purpose it is indeed absolutely essential and cannot be replaced by any kind of map.

The construction of a map virtually resolves itself into the drawing of two sets of lines, one set to represent meridians, the other to represent parallels. These being drawn, the filling in of the outlines of countries presents no difficulty. The first and most natural idea that occurs to one as to the manner of drawing the circles of latitude and longitude is to draw them according to the laws of perspective. But, as Lagrange has remarked, one may regard geographical maps from a more general point of view as representations of the surface of the globe, for which purpose we have but to draw meridians and parallels according to any given law; then any place we have to fix must take that position with reference to these lines that it has on the sphere with reference to the circles of latitude and longitude.

#### PHYSICAL GEOGRAPHY.

This term in its ordinary acceptation means a description of the physical features of the earth. It includes an account of the phenomena of the atmosphere; of the composition, distribution, and movements of the sea; of the forms of the land, with its water circulation, earthquakes, and volcanoes; of the distribution of plant and animal life. Its object, however, is not to present a mere bald enumeration of facts, but to group the facts together in such a way as to bring before the mind a luminous picture of the whole structure and working of



the earth as a habitable planet. Physical geography is not so much a science or branch of science as a collection of the data ascertained, and probable conclusions arrived at, by different sciences, in so far as these bear upon its own subject. Accordingly, it culls from all departments of inquiry whatever helps to give additional distinctness and vividness to that broad conception of the daily economy of the globe which it is its aim to form and develop.

GEOLOGY is the science which investigates the history of the earth. Its object is to trace the progress of our planet from the earliest beginnings of its separate existence, through its various stages of growth, down to the present condition of things. It seeks to determine the manner in which the evolution of the earth's great surface features has been effected. It unravels the complicated processes by which each continent has been built up. It follows, even into detail, the varied sculpture of mountain and valley, crag and ravine. Nor does it confine itself merely to changes in the inorganic world. Geology shows that the present races of plants and animals are the descendants of other and very different races which once peopled the earth. It teaches that there has been a progress of the inhabitants, as well as one of the globe on which they dwelt; that each successive period in the earth's history, since the introduction of living things, has been marked by characteristic types of the animal and vegetable kingdoms; and that, however imperfectly they have been preserved or may be deciphered, materials exist for a history of life upon the planet. The geographical distribution of existing faunas and floras is often made clear and intelligible by geological evidence; and in the same way light is thrown upon some of the remoter phases in the history of man himself. A subject so comprehensive as this must require a wide and varied basis of evidence. It is one of the characteristics of geology to gather evidence from sources which at first sight seem far removed from its scope, and to seek aid from almost every other leading branch of science. Thus, in dealing with the earliest conditions of the planet, the geologist must fully avail himself of the labors of the astronomer. Whatever is ascertainable by telescope, spectroscope, or chemical analysis, regarding the constitution of other heavenly bodies, has a geological bearing. The experiments of the physicist, undertaken to determine conditions of matter and of energy, may sometimes be taken as the starting-points of geological investigation. The work of the chemical laboratory forms the foundation of a vast and increasing mass of geological inquiry. To the botanist, the zoölogist, even to the unscientific, if observant, traveler by land or sea, the geologist turns for information and assistance.

But while thus culling freely from the dominions of other sciences, geology claims as its peculiar territory the rocky framework of the globe. In the materials composing that framework, their composition and arrangement, the processes of their formation, the changes which they have undergone, and the terrestrial revolutions to which they bear witness, lie the main data of geological history. It is the task of the geologist to group these elements in such a way that they may be made to yield up their evidence as to the march of events in the evolution of the planet. He finds that they have, in large measure, arranged themselves in chronological sequence — the oldest lying at the bottom and the newest at the top. Relics of an ancient sea-floor are overlaid by traces of a vanished land-surface; these are in turn covered by the deposits of a former lake, above which once more appear proofs of the return of the sea. Among these rocky records lie the lavas and ashes of long-extinct volcanoes. The ripple left upon the shore,

the cracks formed by the sun's heat upon the muddy bottom of a dried-up pool, the very imprint of the drops of a passing rain-shower, have all been accurately preserved, and yield their evidence as to geological conditions widely different from those which exist where such markings are now found.

But it is mainly by the remains of plants and animals imbedded in the rocks that the geologist is guided in unraveling the chronological succession of geological changes. He has found that a certain order of appearance characterizes these organic remains, that each great group of rocks is marked by its own special types of life, and that these types can be recognized, and the rocks in which they occur can be correlated, even in distant countries, and where no other means of comparison would be possible. At one moment he has to deal with the bones of some large mammal scattered through a deposit of superficial gravel, at another time with the minute foraminifers and ostracods of an upraised seabottom. Corals and crinoids crowded and crushed into a massive limestone, where they lived and died, ferns and terrestrial plants matted together into a bed of coal where they originally grew, the scattered shells of a submarine sand-bank, the snails and lizards which lived and died within a hollow tree, the insects which have been imprisoned within the exuding resin of old forests, the footprints of birds and quadrupeds, the trails of worms left upon former shores — these, and innumerable other pieces of evidence, enable the geologist to realize, in some measure, what the faunas and floras of successive periods have been, and what geographical changes the site of every land has undergone.

It is evident that to deal successfully with these varied materials, a considerable acquaintance with different branches of science is needful. Especially necessary is a tolerably wide knowledge of the processes now at work in changing the surface of the earth, and of at least those forms of plant and animal life whose remains are apt to be preserved in geological deposits, or which in their structure and habits enable us to realize what their foreunners were. It has often been insisted upon that the present is the key to the past; and in a wide sense this assertion is eminently true. Only in proportion as we understand the present, where everything is open on all sides to the fullest investigation, can we expect to decipher the past, where so much is obscure, imperfectly preserved, or not preserved at all. A study of the existing economy of nature ought thus to be the foundation of the geologist's training.

While, however, the present condition of things is thus employed, we must obviously be on our guard against the danger of unconsciously assuming that the phase of nature's operations which we now witness has been the same in all past time, that geological changes have taken place in former ages in the manner and on the scale which we behold to-day, and that at the present time all the great geological processes, which have produced changes in the past eras of the earth's history, are still existent and active. Of course we may assume this unity of action, and use the assumption as a working hypothesis. But it ought not to be allowed any firmer footing, nor on any account be suffered to blind us to the obvious truth that the few centuries wherein man has been observing nature form much too brief an interval by which to measure the intensity of geological action in all past time. For aught we can tell the present is an era of quietude and slow change, compared with some of the eras which have preceded it. Nor can we be sure that, when we have explored every geological process now in progress, we have exhausted all the causes of change which, even in comparatively recent times, have been at work.



In dealing with the Geological Record, as the accessible solid part of the globe is called, we cannot too vividly realize that at the best it forms but an imperfect chronicle. Geological history cannot be compiled from a full and continuous series of documents. From the very nature of its origin the record is necessarily fragmentary, and it has been further mutilated and obscured by the revolutions of successive ages. And even where the chronicle of events is continuous, it is of very unequal value in different places. In one case, for example, it may present us with an unbroken succession of deposits many thousands of feet in thickness, from which, however, only a few meager facts as to geological history can be gleaned. In another instance it brings before us, within the compass of a few yards, the evidence of a most varied and complicated series of changes in physical geography, as well as an abundant and interesting suite of organic remains. These and other characteristics of the geological record will become more apparent and intelligible as we proceed in the study of the science.

In the systematic treatment of the subject the following arrangement may be followed:

1. *The Cosmical Aspects of Geology*.—Under this head we may consider the evidence supplied by astronomy and physics regarding the form and motions of the earth, the composition of the sun and planets, and the probable history of the solar system.

2. *Geognosy—an Inquiry into the Materials of the Earth's Substance*.—In this division we deal with the parts of the earth, its envelopes of air and water, its solid crust, and the probable condition of its interior. Especially, we have to study the more important minerals of the crust, and the chief rocks of which that crust is built up. In this way we lay a foundation of knowledge regarding the nature of the materials constituting the mass of the globe, and may next proceed to investigate the processes by which these materials are produced and altered.

3. *Dynamical Geology* embraces an investigation of the various agencies whereby the rocks of the earth's crust are formed and metamorphosed, and by which changes are effected upon the distribution of sea and land, and upon the forms of terrestrial surfaces. Such an inquiry necessitates a careful study of the existing geological economy of nature, and forms a fitting introduction to the investigation of the geological changes of former periods. This and the previous section include most of what is embraced under Physical Geography; and for the reason stated under that heading the subject will here be treated more in detail than is usual in geological treatises.

4. *Structural Geology, or the Architecture of the Earth*.—We now advance to consider how the various materials composing the crust of the earth have been arranged. We learn that some have been formed in beds or strata on the floor of the sea, that others have been built up by the slow aggregation of organic forms, that others have been poured out in a molten condition or in showers of loose dust from subterranean sources. We further find that, though originally laid down in almost horizontal beds, the rocks have subsequently been crumpled, contorted and dislocated, that they have been incessantly worn down, and have often been depressed and buried beneath later accumulations.

5. *Palæontological Geology*.—This branch of the subject deals with the organic forms which are found preserved in the crust of the earth. It includes such questions as the relations between extinct and living types, the laws which appear to have governed the distribution of life in time and in space, the relative importance of different genera of animals in geological in-

quiry, the nature and use of the evidence from organic remains regarding former conditions of physical geography. This subject will be more properly discussed in the article PALÆONTOLOGY, and will, therefore, be only cursorily treated in the following pages.

6. *Stratigraphical Geology*.—This section might be called geological history. It works out the chronological succession of the great formations of the earth's crust, and endeavors to trace the sequence of events of which they contain the record. More particularly it determines the order of succession of the various plants and animals which in past time have peopled the earth, and thus ascertains what has been the grand march of life upon the planet.

7. *Physiographical Geology*, starting from the basis of fact laid down by stratigraphical geology regarding former geographical changes, embraces an inquiry into the origin and history of the features of the earth's surface—continental ridges and ocean basins, plains, valleys and mountains. It explains the causes on which local differences of scenery depend, and shows under what very different circumstances, and at what widely separated intervals, the hills and mountains, even of a single country, have been produced.

## COSMICAL ASPECTS OF GEOLOGY.

Before geology had attained to the position of an inductive science, it was customary to begin all investigations into the history of the earth by propounding or adopting some more or less fanciful hypothesis in explanation of the origin of our planet, or even of the universe. Such preliminary notions were looked upon as essential to a right understanding of the manner in which the materials of the globe had been put together. To the illustrious James Hutton (1785) geologists are indebted for strenuously upholding the doctrine that it is no part of the province of geology to discuss the origin of things. He taught them that in the materials from which geological evidence is to be compiled there can be found "no traces of a beginning, no prospect of an end." In England, mainly to the influence of the school which he founded, and to the subsequent rise of the Geological Society (1807) which resolved to collect facts instead of fighting over hypotheses, is due the disappearance of the crude and unscientific cosmologies by which the writings of the earlier geologists were distinguished.

But there can now be little doubt that in the reaction against those visionary and often grotesque speculations, geologists were carried too far in an opposite direction. In allowing themselves to believe that geology had nothing to do with the questions of cosmogony, they gradually grew up in the conviction that such questions could never be other than mere speculation, interesting or amusing as a theme for the employment of the fancy, but hardly coming within the domain of sober and inductive science. Nor would they soon have been awakened out of this belief by anything in their own science. It is still true that in the data with which they are accustomed to deal, as comprising the sum of geological evidence, there can be found no trace of a beginning. The oldest rocks which have been discovered on any part of the globe have probably been derived from other rocks older than themselves. Geology by itself has not yet revealed, and is little likely ever to reveal, a trace of the first solid crust of our globe. If then geological history is to be compiled from direct evidence furnished by the rocks of the earth, it cannot begin at the beginning of things, but must be content to date its first chapter from the earliest period of which any record has been preserved among the rocks.



## RELATIONS OF THE EARTH TO THE SOLAR SYSTEM.

Before entering upon the study of the structure and history of the earth, we may with advantage consider the general relations of our planet to the solar system, especially in view of its origin and history. It is now regarded as in the highest degree probable that all the members of that system have had a common origin. The investigations of recent years have revived and given a new form and meaning to the well-known nebular hypothesis, in which Laplace sketched the progress of the system from the state of an original nebula to its existing condition of a central incandescent sun with surrounding cool planetary bodies. He supposed that the nebula, originally diffused at least as far as the farthest member of the system, began to condense toward the center, and that in so doing it threw off or left behind successive rings which on disruption and further condensation assumed the form of planets, sometimes with a further formation of rings, which in the case of Saturn remain, though in other planets they have broken up and united into satellites.

According to this view we should expect that the matter composing the various members of the solar system should be everywhere nearly the same. The fact of condensation around centers, however, indicates at least differences of density throughout the nebula. Mr. Lockyer has, indeed, suggested that the materials composing the nebula arranged themselves according to their respective densities, the lightest occupying the exterior and the heaviest the interior of the mass. And if we compare the densities of the various planets, they certainly seem to support this suggestion. These densities are shown in the following table, that of the earth being taken as the unit:

|                         |      |
|-------------------------|------|
| Density of the Sun..... | 0.25 |
| " Mercury.....          | 1.12 |
| " Venus.....            | 1.03 |
| " Earth.....            | 1.00 |
| " Mars.....             | 0.70 |
| " Jupiter.....          | 0.24 |
| " Saturn.....           | 0.13 |
| " Uranus.....           | 0.17 |
| " Neptune.....          | 0.16 |

There is not indeed a strict progression in the diminution of density, but the fact remains that, while the planets near the sun are about twice as heavy as they would be if they consisted of such a substance as granite, toward the outer limits of the system they are composed of matter as light as cork. Again, in some cases, a similar relation has been observed between the densities of the satellites and their primaries. The moon, for example, has a density little more than half that of the earth. The first satellite of Jupiter is less dense, though the other three are found to be more dense than the planet. Further, in the condition of the earth itself, a very light gaseous atmosphere forms the outer portion, beneath which lies a heavier layer of water, while within these two envelopes the materials forming the solid substance of the planet are so arranged that the outer layer or crust has only about half the density of the whole globe. Mr. Lockyer finds in the sun itself evidence of the same tendency toward a stratified arrangement in accordance with relative densities, as will be immediately further alluded to.

There seems therefore to be much probability in the hypothesis that, in the gradual condensation of the original nebula, each successive mass left behind represented the density of a parent layer, and consisted of progressively heavier matter. The remoter planets, with their low density and vast absorbing atmospheres, may be supposed to consist of metalloids like the outer parts of the sun's atmosphere, while the interior planets

are no doubt mainly metallic. The rupture of each planetary ring would, it is conceived, raise the temperature of the resultant nebulous planet to such a height as to allow the vapors to rearrange themselves by degrees in successive layers, or rather shells, according to density. And when the planet gave off a satellite, that body would, it might be expected, have the composition and density of the outer layers of its primary.

For many years the only evidence available as to the actual composition of other heavenly bodies than our own earth was furnished by the *aërolites*, *meteorites*, or falling stars, which from time to time have entered our atmosphere from planetary space, and have descended upon the surface of the globe. Subjected to chemical analysis these foreign bodies show considerable diversities of composition; but in no case have they yet yielded a trace of any element not already recognized among terrestrial materials. Upward of twenty of our elements have been detected in *aërolites*, sometimes in the free state, sometimes combined with each other. More than half of them are metals, including iron, nickel, manganese, calcium, sodium, and potassium.

But in recent years a far more precise and generally applicable method of research into the composition of the heavenly bodies has been found in the spectroscope. By means of this instrument, the light emitted from self-luminous bodies can be analyzed in such a way as to show what elements are present in their intensely hot luminous vapor.

By this method of examination it has been ascertained that many of the elements of which our earth is composed exist in the state of incandescent vapor in the atmosphere of the sun.

The spectroscope has likewise been successfully applied by Mr. Huggins and others to the observation of the fixed stars and nebulae, with the result of establishing a similarity of elements between our own system and other bodies in sidereal space. In the radiation spectra of nebulae Mr. Huggins finds the hydrogen lines very prominent; and he conceives that they may be glowing masses of that element. Sir William Thomson and Professor Tait have suggested, on the other hand, that they are more probably clouds of stones in rapid motion, perhaps in an atmosphere of hydrogen. Among the fixed stars absorption spectra have been recognized, pointing to a structure resembling that of our sun, viz.: a solid or liquid incandescent nucleus, surrounded with an atmosphere of glowing vapor. According to Mr. Lockyer, those stars or nebulae which have the highest temperature have the simplest spectra, and in proportion as they cool their materials become more and more differentiated into what we call elements. He remarks that the most brilliant or hottest stars show in their spectra only the lines of gases, as hydrogen. Cooler stars, like our sun, give indications of the presence, in addition, of the more stable metals—magnesium, sodium, calcium, iron. A still lower temperature he regards as marked by the appearance of the other metals, metalloids and compounds, so that the older a star or planet is the more will it lose free hydrogen, till when it comes to the condition of our earth, all its free hydrogen will have disappeared. According to this view the atoms of all the elements existed originally in the nebula dissociated from each other by reason of the intense heat. As the nebula gravitated toward its nucleus and cooled, the atoms came together, and the elements appeared in a certain order, beginning with hydrogen, and passing on through the metals and metalloids into compounds such as we find on our globe. The sun would thus be a star considerably advanced in the process of differentiation or association of its atoms. It contains, so far as we know, no metalloids or compounds, while



stars like Sirius show the presence only of hydrogen, with but a feeble proportion of metallic vapors; and on the other hand, the red stars indicate by their spectra that their metallic vapors have entered into combination, whence it is inferred that their temperature is lower than that of our sun.

Further confirmation of these views as to the order of planetary evolution is furnished by the form and structure of the earth. Reference has already been made to the fact that the outer crust of our planet possesses only about half the density of the whole mass. It consists largely of metalloids—oxygen, silicon, carbon, sulphur, chlorine. On the other hand, lavas and mineral veins, which are believed to have been supplied from some considerable depth, contain abundance of metallic ingredients.

The form of the globe likewise points to a former fluid condition. As the result of computations from ten measured arcs of the meridian, made by different observers, between the latitudes of Sweden and the Cape of Good Hope, Bessel obtained the following data for the dimensions of the earth:

|                            |                     |                  |
|----------------------------|---------------------|------------------|
| Equatorial diameter.....   | 41,847,192 feet, or | 7,925.604 miles. |
| Polar diameter.....        | 41,707,314 “ “      | 7,899.114 “      |
| Amount of polar flattening | 139,768 “ “         | 26.471 “         |

The equatorial circumference is thus a little less than 25,000 miles, and the difference between the polar and equatorial diameters (nearly  $26\frac{1}{2}$  miles) amounts to about  $\frac{1}{300}$  of the equatorial diameter. More recently, however, it has been shown that the oblate spheroid indicated by these measurements is not a symmetrical body, the equatorial circumference being an ellipse instead of a circle.

In obedience to the influence of rotation on its axis, our planet would tend to assume exactly such a flattening at the poles as it has been proved to possess. This was discovered and demonstrated by Newton, and the amount of the ellipticity was actually calculated by him, long before any measurement had confirmed such a conclusion.

### GEOGNOSEY.

Before we enter upon any discussion of the geological changes which our planet has undergone, it is needful first of all to study the materials of which the planet consists. It is from the evidence furnished by the nature and arrangement of these materials that geological history must be compiled.

Viewed in a broad way then, the earth may be considered as consisting of (1) two envelopes—an outer one of gas completely surrounding the planet, and an inner one of water covering about three-fourths of the globe; and (2) a globe cool and solid on its surface but possessing a high internal temperature.

#### THE ENVELOPES.

*The Atmosphere.*—The gaseous envelope to which the name of atmosphere is given extends at least to a distance of forty or forty-five miles from the earth's surface, perhaps in a state of extreme tenuity to a much greater height. But its thickness must necessarily vary with latitude and changes in atmospheric pressure; the layer of air lying over the poles is not so deep as that which surrounds the equator.

Many speculations have been made regarding the chemical composition of the atmosphere during former geological periods. There can indeed be no doubt that it must originally have differed very greatly from its present condition. The oxygen which now forms fully a half of the outer crust of the earth was originally doubtless part of the atmosphere. So, too, the vast beds of coal found all over the world, in geological formations of many different ages, represent so much carbonic acid once present in the air. The chlorides in

the sea likewise were probably carried down out of the atmosphere in the primitive condensation of the aqueous vapor. It has often been suggested that during the Carboniferous period the atmosphere must have been warmer and with more aqueous vapor and carbonic acid in its composition than at the present day, to admit of so luxuriant a flora as that from which the coal seams were formed. There seems, however, to be at present no method of arriving at any certainty on this subject.

As now existing, the atmosphere is considered to be normally a mechanical mixture of nearly four volumes of nitrogen and one of oxygen, with a minute proportion of carbonic acid, and still smaller quantities of other substances. Expressed in a tabular form this composition is as follows:

|                    |       |
|--------------------|-------|
| Nitrogen.....      | 79.00 |
| Oxygen.....        | 20.96 |
| Carbonic acid..... | 0.04  |

*The Oceans.*—About three-fourths of the surface of the globe (or about 144,712,000 square miles) is covered by the irregular sheet of water known as the sea. Within the last ten years much new light has been thrown upon the depths, temperatures, and biological conditions of the ocean-basins, more particularly by the *Lightning*, *Porcupine*, and *Challenger* expeditions fitted out by the British Government.

The water of the oceans is distinguished from the ordinary terrestrial waters by a higher specific gravity, and the presence of so large a proportion of saline ingredients as to impart a strongly salt taste. The average density of sea-water is about 1.026, but it varies slightly in different parts even of the same ocean.

The greater density of sea-water depends of course upon the salts which it contains in solution. There seems no reason to doubt that these salts are, in the main, parts of the original constitution of the sea, and thus that the sea has always been salt. It is also probable that, as in the case of the atmosphere, the composition of the ocean water has in former geological periods been very different from what it is now, and that it has acquired its present character only after many ages of slow change, and the abstraction of much mineral matter originally contained in it. There is evidence indeed among the geological formations that large quantities of lime, silica, chlorides, and sulphates have in the course of time been removed from the sea.

#### THE SOLID GLOBE.

*General Considerations.*—Within the atmospheric and oceanic envelopes lies the inner solid globe. Reference has already been made to the comparative density of the planet among the other members of the solar system. In all speculation about the history of the earth, the density of the whole mass of the planet as compared with water—the standard to which the specific gravities of terrestrial bodies are referred—is a question of prime importance. Various methods have been employed for determining the earth's density. The deflection of the plumb-line on either side of a mountain of known structure and density, the time of oscillation of the pendulum at great heights, at the sea-level, and in deep mines, the comparative force of gravitation as measured by the torsion balance—each of these processes has been tried with the following various results:

|                                                                                                             |       |
|-------------------------------------------------------------------------------------------------------------|-------|
| Plumb-line experiments on Schiehallien (Maske-lyne and Playfair) gave as the mean density of the earth..... | 4.713 |
| Plumb-line experiments on Arthur's Seat, Edinburgh (James).....                                             | 5.316 |
| Pendulum experiments on Mont Cenis (Carlini and Giulio).....                                                | 4.950 |
| Pendulum experiments in Harton coal-pit, Newcastle (Airy).....                                              | 6.565 |
| Torsion balance experiments (Cavendish).....                                                                | 5.480 |
| Torsion balance experiments (Baily).....                                                                    | 5.660 |



Though these observations are somewhat discrepant, we may feel satisfied that the globe has a mean density neither much more nor much less than 5.5; that is to say, it is five and a half times heavier than one of the same dimensions formed of pure water. Now the average density of the materials which compose the accessible portions of the earth is between 2.5 and 3; so that the mean density of the whole globe is about twice as much as that of its outer part. We might therefore infer that the inside consists of much heavier materials than the outside, and consequently that the mass of the planet must contain at least two dissimilar portions—an exterior lighter crust or rind, and an interior heavier nucleus. But the effect of pressure must necessarily increase the specific gravity of the interior as will be alluded to further on.

*The Crust.*—It was formerly a prevalent belief that the exterior and interior of the globe differed from each other to such an extent that, while the outer parts were cool and solid, the vastly more enormous inner part being intensely hot was more or less completely fluid. Hence the term "crust" was applied to the external rind in the usual sense of that word. This crust was variously computed to be ten, fifteen and twenty or more miles in thickness. For reasons which will be afterward given, the idea of internal liquidation has been opposed by eminent physicists and is now abandoned by most geologists. The term "crust," however, continues to be used as a convenient word to denote the cool, upper, or outer layer of the earth's mass, accessible to human observation. It is in the structure and history of this crust that the main subjects of geological investigation are contained. Evidently our direct acquaintance with the chemical constitution of the globe must be limited to that of the crust, though by inference we may eventually reach highly probable conclusions regarding the constitution of the interior. Chemical research has discovered that sixty-four simple or as yet indecomposable bodies, called elements, in various proportions and compounds, constitute the accessible part of the crust. Of these, however, the great majority are comparatively of rare occurrence. The crust, so far as we can examine it, is mainly built up of about sixteen elements, which may be arranged in the two following groups, the most abundant bodies being placed first in each list:—

| METALLOIDS.      |                | METALS.        |                |
|------------------|----------------|----------------|----------------|
|                  | Atomic Weight. |                | Atomic Weight. |
| Oxygen.....      | 15.96          | Aluminium..... | 27.30          |
| Silicon.....     | 28.00          | Calcium ...    | 39.90          |
| Carbon.....      | 11.97          | Magnesium..... | 23.94          |
| Sulphur.....     | 31.98          | Potassium..... | 39.04          |
| Hydrogen.....    | 1.00           | Sodium.....    | 22.99          |
| (really a metal) |                | Iron.....      | 55.90          |
| Chlorine.....    | 35.37          | Manganese..... | 54.80          |
| Phosphorus.....  | 30.96          | Barium.....    | 136.80         |
| Fluorine.....    | 19.10          |                |                |

By far the most abundant and important of these elements is oxygen. It forms about 23 per cent. by weight of air, 88.88 per cent. of water, and about a half of all the rocks which compose the visible portion or "crust" of the globe. Another metalloid, silicon, comes next in abundance. It is always united with oxygen, forming the mineral silica which, either alone or in combination with various metallic bases as silicates, constitutes a half of all the known mass of the globe. Of the remaining metalloids carbon and sulphur sometimes occur in the free state, but usually in combination with oxygen or some base or metal. Chlorine and fluorine are found associated with metallic bases. Hydrogen is properly a metal, and occurs chiefly in combination with oxygen as the oxide, water. Phosphorus occurs with oxygen principally in phosphate of lime.

Of the metals by far the most important in the archi-

tecture of the exterior of the earth is aluminium. In conjunction with oxygen and silicon it forms the basis of most crystalline rocks. Calcium, magnesium, potassium, and sodium, combined with oxygen, enter largely into the composition of rocks. Iron is the great coloring material in nature, most of the yellow, brown, red, and green hues of rocks being due to some of its combinations. The sixteen elements mentioned in the foregoing lists form about ninety-nine parts of the earth's crust; the other elements constitute only about a hundredth part, though they include gold, silver, copper, tin, lead, and the other useful metals, iron excepted.

*The Interior or Nucleus.*—Though we cannot hope ever to have direct acquaintance with more than the mere outside skin of our planet, we may be led to infer the irregular distribution of materials within the crust from the present distribution of land and water, and the observed differences in the amount of deflection of the plumb-line near the sea and near mountain-chains. The fact that the southern hemisphere is almost wholly covered with water appears explicable only on the assumption of an excess of density in the mass of that portion of the planet. The existence of such a vast sheet of water as that of the Pacific Ocean is to be accounted for, says Archdeacon Pratt, by the presence of "some excess of matter in the solid parts of the earth between the Pacific Ocean and the earth's center, which retains the water in its place, otherwise the ocean would flow away to the other parts of the earth." The same writer points out that a deflection of the plumb-line toward the sea, which has in a number of cases been observed, indicates that "the density of the crust beneath the mountains must be less than that below the plains, and still less than that below the ocean bed." Apart therefore from the depressions of the earth's surface in which the oceans lie, we must regard the internal density, whether of crust or nucleus, to be somewhat irregularly arranged,—there being an excess of heavy materials in the water hemisphere and beneath the ocean-beds as compared with the continental masses.

In the evidence obtainable as to the former history of the earth, no fact is of more importance than the existence of a high temperature beneath the crust, which has now been placed beyond all doubt. This feature of the planet's organization is made clear by the following proofs:

*Volcanoes.*—In many regions of the earth's surface openings exist from which steam and hot vapors, ashes and streams of molten rock are from time to time emitted. The abundance of these openings seems inexplicable by any mere local causes, but must be regarded as indicative of a very high internal temperature. If to the still active vents of eruption we add those which have formerly been the channels of communication between the interior and the surface, there are probably few large regions of the globe where proofs of volcanic action cannot be found. Everywhere we meet with masses of molten rock which have risen from below as if from some general reservoir.

*Hot Springs.*—Where volcanic eruptions have ceased, evidence of a high internal temperature is still often to be found in springs of hot water, which continue for centuries to maintain their heat. Thermal springs, however, are not confined to volcanic districts. They sometimes rise even in regions many hundreds of miles distant from any active volcanic vent.

*Borings, Wells and Mines.*—The influence of the seasonal changes of temperature extends downward from the surface to a depth which varies according to latitude, to the thermal conductivity of the soils and rocks, and perhaps to other causes. The cold of winter



and the heat of summer may be regarded as following each other in successive waves downward, until they disappear along a limit at which the temperature remains constant. This zone of invariable temperature is believed to lie somewhere between sixty and eighty feet down in temperate regions. At Yakutsk in eastern Siberia (latitude  $62^{\circ}$  N.), however, the soil is permanently frozen to a depth of about 700 feet. In Java, on the other hand, a constant temperature is said to be met with at a depth of only two or three feet.

It is a remarkable fact, now verified by observation all over the world, that below the limit of the influence of ordinary seasonal changes the temperature, so far as we yet know, is nowhere found to diminish downward. It always rises; and its rate of increment never falls much below the average. The only exceptional cases occur under circumstances not difficult of explanation. On the one hand, the neighborhood of hot-springs, of large masses of lava, or of other manifestations of volcanic activity, may raise the subterranean temperature much above its normal condition; and this augmentation may not disappear for many thousand years after the volcanic activity has wholly ceased, since the cooling down of a subterranean mass of lava would necessarily be a very slow process. On the other hand, the spread of a thick mass of snow and ice over any considerable area of the earth's surface, and its continuance there for several thousand years, would so depress the subterranean isothermals that for many centuries afterward there might be a fall of temperature for a certain distance downward. At the present day, in at least the more northerly parts of the northern hemisphere, there are such evidences of a former more rigorous climate, as in the well sinking at Yakutsk already referred to. But beneath the limit to which the influence of the changes of the seasons extends, observations in most parts of the globe show that the temperature invariably rises as we penetrate toward the interior of the earth.

*Probable Condition of the Earth's Interior.*—Various theories (mostly fanciful) have been propounded on this subject. There are only three which merit serious consideration. (1) One of these supposes the planet to consist of a solid crust and a molten interior. (2) The second holds that, with the exception of local vesicular spaces, the globe is solid and rigid to the center. (3) The third contends that, while the mass of the globe is solid, there lies a liquid substratum beneath the crust.

1. The arguments in favor of internal liquidity may be summed up as follows. (a) The ascertained rise of temperature inward from the surface is such that, at a very moderate depth, the ordinary melting point of even the most refractory substances would be reached. At twenty miles the temperature, if it increases progressively, as it does in the depths accessible to observation, must be about  $1,760^{\circ}$  Fahr.; at fifty miles it must be  $4,600^{\circ}$ , or far higher than the fusing-point even of so stubborn a metal as platinum, which melts at  $3,080^{\circ}$  Fahr. (b) All over the world volcanoes exist from which steam and torrents of molten lava are from time to time erupted. Abundant as are the active volcanic vents, they form but a small proportion of the whole which have been in operation since early geological time. It has been inferred therefore that these numerous funnels of communication with the heated interior could not have existed and poured forth such a vast amount of molten rock, unless they drew their supplies from an immense internal molten nucleus. (c) When the products of volcanic action from different and widely-separated regions are compared and analyzed, they are found to exhibit a remarkable uniformity of character. (d) The abundant earthquake shocks which

affect large areas of the globe are maintained to be inexplicable unless on the supposition of the existence of a thin and somewhat flexible crust. These arguments, it will be observed, are only of the nature of inferences drawn from observations of the present constitution of the globe. They are based on geological data, and have been frequently urged by geologists as supporting the only view of the nature of the earth's interior compatible with geological evidence.

2. The arguments against the internal fluidity of the earth are based on physical and astronomical considerations of the greatest importance. They may be arranged as follows:

(a) Argument from precession and nutation.—The problem of the internal condition of the globe was attacked as far back as the year 1839 by the late Mr. Hopkins of Cambridge, who endeavored to calculate how far the planetary motions of precession and nutation would be influenced by the solidity or liquidity of the earth's interior. He found that the precessional and nutational movements could not possibly be as they are if the planet consisted of a central ocean of molten rock surrounded with a crust of twenty or thirty miles in thickness, that the least possible thickness of crust consistent with the existing movements was 800 to 1,000 miles, and that the whole might even be solid to the center, with the exception of comparatively small vesicular spaces filled with melted rock.

M. Delaunay, in a paper on *The Hypothesis of the Interior Fluidity of the Globe*, threw doubt on Hopkins' views, and suggested that, if the interior were a mass of sufficient viscosity, it might behave as if it were a solid, and thus the phenomenon of precession and nutation might not be affected. Sir William Thomson, who had already arrived at the conclusion that the interior of the globe must be solid, and acquiesced generally in Hopkins' conclusions, pointed out that M. Delaunay had not worked out the problem mathematically, otherwise he could not have failed to see that the hypothesis of a viscous and quasi-rigid interior "breaks down when tested by a simple calculation of the amount of tangential force required to give to any globular portion of the interior mass the precessional and nutational motions which, with other physical astronomers, he attributes to the earth as a whole." Sir William, in making this calculation, holds that it demonstrates the earth's crust down to depths of hundreds of kilometers to be capable of resisting such a tangential stress (amounting to nearly  $\frac{1}{10}$  of a gramme weight per centimeter) as would with great rapidity draw out of shape any plastic substance which could properly be termed a viscous fluid. "An angular distortion of  $8''$  is produced in a cube of glass by a distorting stress of about ten grammes weight per square centimeter. We may therefore safely conclude that the rigidity of the earth's interior substance could not be less than a millionth of the rigidity of glass without very sensibly augmenting the lunar nineteen-yearly nutation."

The assumption of a comparatively thin crust requires that the crust shall have such perfect rigidity as is possessed by no known substance. The tide-producing force of the moon and sun exerts such a strain upon the substance of the globe that it seems in the highest degree improbable that the planet could maintain its shape as it does unless the supposed crust were at least 2,000 or 2,500 miles in thickness. That the solid mass of the earth must yield to this strain is certain, though the amount of deformation is so slight as to have hitherto escaped all attempts to detect it. Had the rigidity been even that of glass or of steel, the deformation would probably have been by this time detected, and the actual phenomena of precession and nutation, as



well as of the tides, would then have been very sensibly diminished. The conclusion is thus reached that the mass of the earth "is on the whole more rigid certainly than a continuous solid globe of glass of the same diameter.

(b) Argument from the tides.—The phenomena of the oceanic tides are only explicable on the theory that the earth is either solid to the center, or possesses so thick a crust (2,500 miles or more) as to give to the planet practical solidity. Sir William Thomson remarks that, "were the crust of continuous steel, and 500 kilometers thick, it would yield very nearly as much as if it were india-rubber to the deforming influences of centrifugal force, and of the sun's and moon's attractions." It would yield, indeed, so freely to these attractions "that it would simply carry the waters of the ocean up and down with it, and there would be no sensible tidal rise and fall of water relatively to land.

(c) Argument from relative densities of melted and solid rock. The two preceding arguments must be considered decisive against the hypothesis of a thin shell or crust covering a nucleus of molten matter. It has been further urged, however, as an objection to this hypothesis, that cold solid rock is necessarily more dense than hot melted rock, and that even if a thin crust were formed over the central molten globe it would immediately break up and the fragments would sink toward the center. Undoubtedly this would happen were the material of the earth's mass of the same density throughout. But, as has been already pointed out, the specific gravity of the interior is at least twice as much as that of the visible parts of the crust. If this difference be due, not merely to the effect of pressure, but to the presence in the interior of intensely heated metallic substances, we cannot suppose that solidified portions of such rocks as granite and the various lavas could ever have sunk into the center of the earth, so as to build up there the honeycombed cavernous mass which might have served as a nucleus in the ultimate solidification of the whole planet. From the considerations above advanced we have seen that the earth's central mass may be plausibly conjectured to be metallic. Into this dense central mass the comparatively light crust could not sink, though its earliest formed portions would no doubt descend until they reached a stratum with specific gravity agreeing with their own, or until they were again melted.

*Age of the Earth and Measures of Geological Time.*—The age of our planet is a problem which may be attacked either from the geological or physical side.

1. The geological argument rests chiefly upon the observed rates at which geological changes are being effected at the present time, and is open to the obvious preliminary objection that it assumes the existing rate of change as the measure of past revolutions—an assumption which may be entirely erroneous, for the present may be a period when all geological events march forward more slowly than they used to do. The argument proceeds on data partly of a physical and partly of an organic kind. (a) The physical evidence is derived from such facts as the observed rates at which the surface of a country is being lowered by rain and streams, and new sedimentary deposits are formed. If we assume that the land has been worn away, and that stratified deposits have been laid down at the same rate as at present, then we must admit that the stratified portion of the crust of the earth must represent a very vast period of time. Doctor Croll puts this period at not less, but possibly much more, than sixty million years. (b) On the other hand, human experience, so far as it goes, warrants the belief that changes in the organic world proceed

with extreme slowness. Yet in the stratified rocks of the earth's crust we have abundant proof that the whole fauna and flora of the earth's surface have passed through numerous cycles of revolution—species, genera, families, appearing and disappearing many times in succession. On any supposition it must be admitted that these vicissitudes in the organic world can only have been effected with the lapse of vast periods of time, though no reliable standard seems to be available whereby these periods are to be measured. The argument from geological evidence is strongly in favor of an interval of probably not much less than one hundred million years since the earliest form of life appeared upon the earth, and the oldest stratified rocks began to be laid down.

2. The argument from physics as to the age of our planet is based by Sir William Thomson upon three kinds of evidence:—(1) the internal heat and rate of cooling of the earth; (2) the tidal retardation of the earth's rotation; and (3) the origin and age of the sun's heat.

(1) Sir William Thomson, applying Fourier's theory of thermal conductivity, pointed out some years ago (1862) that in the known rate of increase of temperature downward and beneath the surface, and the rate of loss of heat from the earth, we have a limit to the antiquity of the planet. He showed, from the data available at the time, that the superficial consolidation of the globe could not have occurred less than twenty million years ago, or the underground heat would have been greater than it is; nor more than four hundred million years ago, otherwise the underground temperature would have shown no sensible increase downward. He admitted that very wide limits were necessary. In more recently discussing the subject, he inclines rather toward the lower than the higher antiquity, but concludes that the limit, from a consideration of all the evidence, must be placed within some such period of past time as one hundred million of years.

(2) The argument from tidal retardation proceeds on the admitted fact that, owing to the friction of the tide-wave, the rotation of the earth is retarded, and is therefore much slower now than it must have been at one time. Sir William Thomson contends that had the globe become solid some ten thousand million years ago, or indeed any high antiquity beyond one hundred million years, the centrifugal force due to the more rapid rotation must have given the planet a very much greater polar flattening than it actually possesses. He admits, however, that, though one hundred million years ago that force must have been about three per cent. greater than now, yet "nothing we know regarding the figure of the earth and the disposition of land and water would justify us in saying that a body consolidated when there was more centrifugal force by three per cent. than now might not now be in all respects like the earth, so far as we know it at present." Professor Tait, in repeating this argument, concludes that, taken in connection with the previous one, "it probably reduced the possible period which can be allowed to geologists to something less than ten millions of years." He does not state, however, on what grounds he so reduces the available period, nor does he notice the objection urged by Dr. Croll that, granting the gradual submergence of the polar lands owing to the slackened speed of rotation, the subaërial denudation of the rising equatorial land might keep pace with the effects of the oceanic subsidence, so that we cannot infer from the present form of the earth what may have been its precise amount of polar compression at the time of solidification.

(3) The third argument, based upon the age of the



sun's heat, is confessedly less reliable than the two previous ones. It proceeds upon calculations as to the amount of heat which would be available by the falling together of masses from space, which gave rise by their impact to our sun. The vagueness of the data on which this argument rests may be inferred from the fact that in one passage Professor Tait places the limit of time during which the sun has been illuminating the earth as, "on the very highest computation, not more than about fifteen or twenty millions of years," while, in another sentence of the same volume, he admits that, "by calculations in which there is no possibility of large error, this hypothesis [of the origin of the sun's heat by the falling together of masses of matter] is thoroughly competent to explain one hundred millions of years solar radiation at the present rate, perhaps more." One hundred millions of years is probably amply sufficient for all the requirements of geology.

#### COMPOSITION OF THE EARTH'S CRUST.

The visible and accessible portion of the earth is formed of minerals and rocks. A mineral may be classified as an inorganic body distinguished by a more or less definite chemical composition, and usually a characteristic geometrical form. A rock is an aggregate mass, sometimes of one, more commonly of two or more minerals. Upward of 800 species of minerals and a vast number of varieties have been described. A very large proportion of these occur but rarely, and, though interesting and important to the mineralogist, do not demand the special attention of the geologist. While almost every mineral may be made to yield data of more or less geological significance, only those which enter into the composition of rock masses, or which are of frequent occurrence as accessories there, require to be familiarly known by the student of geology.

A rock may be defined as a mass of mineral matter, composed of one, more usually of several, kinds of mineral,—having, as a rule, no definite external form, and liable to vary considerably in chemical composition. The crust of the earth is built up of rocks, including under this term, not only hard solid masses like granite and limestone, but even all loose incoherent deposits such as mud, soil, peat and blown sand.

(1) *Structure*, or the manner in which the component particles have been built up into the mineral masses called rocks, is the fundamental character. Viewed broadly, there are two leading types of structure among rocks—crystalline or massive and fragmental.

A precise yet convenient classification of rocks is still required. We may adopt chemical characters as the basis of arrangement, and group rocks according as they may be sulphates, carbonates, silicates, etc.; but in so doing we place together rocks which, from a geological point of view, have no real affinity. Again, we may select mineralogical composition as the groundwork of the classification; but in this case also great violence may be done in the geological relationships of the rocks. In many respects the long established geological arrangement according to manner of production is a useful one—igneous, aqueous, and metamorphic rocks. There is, of course, the obvious objection to it that it starts upon a preconceived theory of the origin of the rocks, and this objection must be admitted to be serious. Every year, however, is diminishing its force by making us more certain of the mode of formation of different rocks; and, probably, some modification of it will in the end be very generally adopted.

#### DYNAMICAL GEOLOGY.

Under this section is included the investigation of those processes of change which are at present in

progress upon the earth, whereby modifications are made on the structure and composition of the crust, on the relations between the interior and the surface, as shown by volcanoes, earthquakes, and other terrestrial disturbances, on the distribution of oceans and continents, on the outlines of the land, on the form and depth of the sea-bottom, on climate, and on the races of plants and animals by which the earth is tenanted. It brings before us, in short, the whole range of activities which it is the province of geology to study, and leads us to precise notions regarding their relations to each other, and the results which they achieve. A knowledge of this branch of the subject is thus the essential groundwork of a true and fruitful acquaintance with the principles of geology seeing that it necessitates a study of the present order of nature, and thus provides a key for the interpretation of the past.

The whole range of operations included within the scope of inquiry in this branch of the science may be regarded as a vast cycle of change, into which we may break at any point, and round which we may travel, only to find ourselves brought back to our starting-point. It is a matter of comparatively small moment at what part of the cycle we begin our inquiries. We shall always find that the changes we see in action have resulted from some that preceded, and give place to others which follow them.

At an early time in the earth's history, anterior to any of the periods of which a record remains in the visible rocks, the chief sources of geological action probably lay within the earth itself. The planet still retained a great store of its initial heat, and in all likelihood was the theater of great chemical changes, giving rise, perhaps, to manifestations of volcanic energy somewhat like those which have so marvelously roughened the surface of the moon. As the outer layers of the globe cooled, and the disturbances due to internal heat and chemical action became less marked, the influence of the sun, which must always have operated, would then stand out more clearly, giving rise to that wide circle of superficial changes wherein variations of temperature and the circulation of air and water over the surface of the earth come into play.

In the pursuit of his inquiries into the past history and into the present *régime* of the earth, the geologist must needs keep his mind ever open to the reception of evidence for kinds and especially for degrees of action which he had not before imagined. Human experience has been too short to allow him to assume that all the causes and modes of geological change have been definitively ascertained. On the earth itself there may remain for future discovery evidence of former operations by heat, magnetism, chemical change, or otherwise, which may explain many of the phenomena with which geology has to deal. Of the influences, so many and profound, which the sun exerts upon our planet, we can as yet only dimly perceive a little. Nor can we tell what other cosmical influences may have lent their aid in the evolution of geological changes.

In the present state of our knowledge, all the geological energy upon and within the earth must ultimately be traced back to our parent sun. There is, however, a certain propriety and convenience in distinguishing between that part of it which is due to the survival of some of the original energy of the planet, and that part which arises from the present supply of energy received day by day from the sun. In the former case we have to deal with the interior of the earth and its reaction upon the surface; in the latter we deal with the surface of the earth, and to some extent with its reaction on the interior. This distinction allows of a broad treatment of the subject under two divisions:



I. *Hypogene or Plutonic Action*—the changes within the earth caused by original internal heat and by chemical action.

II. *Epigene or Surface Action*—the changes produced on the superficial parts of the earth, chiefly by the circulation of air and water set in motion by the sun's heat.

#### HYPOGENE ACTION.

In the discussion of this branch of the subject we must carry in our minds the conception of a globe still intensely hot in its interior, radiating heat into space, and consequently contracting in bulk. Portions of molten rocks from inside are from time to time poured out at the surface. Sudden shocks are generated by which destructive earthquakes are propagated to and along the surface. Wide geographical areas are pushed up or allowed to sink down. In the midst of these movements very remarkable changes are produced upon the rocks of the crust; they are shattered, fractured, squeezed, crumpled, rendered crystalline, and even fused.

#### *Volcanoes and Volcanic Action.*

The term volcanic action (vulcanism or vulcanicity) embraces all the phenomena connected with the expulsion of heated materials from the interior of the earth to the surface. Among these phenomena there are some of an evanescent character, while others leave permanent proofs of their existence. It is naturally to the latter that the geologist gives the chief attention, for it is by their means that he can trace the former phases of volcanic activity in regions where, for many ages, there have been no volcanic eruptions. In the operations of existing volcanoes he can observe only the superficial manifestations of volcanic action. But, examining the rocks of the earth's crust, he discovers that in the lapse of ages, amid the many terrestrial revolutions which geology reveals, the very roots of former volcanoes have been laid bare, displaying subterranean phases of vulcanism which could not be studied in any modern volcano. Hence an acquaintance only with active volcanoes will not give us a complete knowledge of volcanic action. It must be supplemented and enlarged by an investigation of the traces of former volcanoes preserved in the crust of the earth.

The openings by which the heated materials from the interior reach the surface include volcanoes (with their accompanying orifices), hot-springs and gas-springs. A volcano may be defined as a conical eminence, composed wholly or mainly of materials which have been ejected from below, and which have accumulated at the surface round the vent of eruption. As a rule it presents at its summit a cup-shaped cavity termed the crater, at the bottom of which is the top of the main funnel or pipe whereby the communication is maintained with the heated interior. A volcano, when of small size, may consist merely of one diminutive cone; when of the largest dimensions, it forms a huge mountain, with many subsidiary cones and many lateral fissures or pipes, from which the heated volcanic products are given out.

It is usual to class volcanoes as *active*, *dormant* and *extinct*. This arrangement, however, often presents considerable difficulty in its application. An active volcano cannot of course be mistaken, for even when not in actual eruption it shows, by its abundant evolution of steam and hot vapors, that it might break out into activity at any moment. But it is in many cases impossible to decide whether a volcano should be called extinct or only dormant.

The materials erupted from volcanic vents may be classed as (1) gases and vapors, (2) lavas, (3) fragmentary substances.

Volcanic action may be either constant or periodic.

Stromboli, in the Mediterranean, so far as we know, has been uninterruptedly emitting hot stones, steam and lava from the earliest period of history. Among the Moluccas the volcano Sioa, and in the Friendly Islands that of Tofua, have never ceased to be in eruption since their first discovery. The lofty cone of Sangay, among the Andes of Quito, is always giving off hot vapors; Cotopaxi, too, is constantly active. But, though examples of unceasing action may thus be cited from widely different quarters of the globe, they are nevertheless exceptional. The general rule is that a volcano breaks out from time to time with greater or less fury, and after longer or shorter intervals of quiescence.

To what particular cause or series of causes any special eruption may be due is a question to which at present no definite answer can be given. An attempt has been made to show that the explosions of a volcano are to some extent regulated by the conditions of atmospheric pressure over the area at the time. In the case of a volcanic funnel like Stromboli, where the expansive subterranean force within and the repressive effect of atmospheric pressure without just balance each other, any serious disturbance of that pressure might be expected to make itself evident by a change in the condition of the volcano. Accordingly, it has long been remarked by the fishermen of the Lipari Islands that in stormy weather there is at Stromboli a more copious discharge of steam and stones than in fine weather. They make use of the cone as a weather-glass, the increase of its activity indicating a falling, and the diminution a rising barometer.

The approach of an eruption is not always indicated by any premonitory symptoms, for many tremendous explosions are recorded to have taken place in different parts of the world without any perceptible warning. Much in this respect would appear to depend upon the condition of liquidity of the lava, and the amount of resistance offered by it to the passage of the escaping vapors through its mass.

The eruptions of Vesuvius are often preceded by a failure or diminution of the wells and springs in the district. But more frequent indications of an approaching outburst are conveyed by sympathetic movements of the ground beneath. Rumbles and groanings from a subterranean source are heard; slight tremors succeed, increasing in frequency and violence till they become distinct earthquake shocks. The vapors from the crater rise more abundantly into the air. All this time the lava column in the pipe or funnel of the volcano has been slowly ascending, forced upward and kept in perpetual agitation by the passage of the elastic vapors through its mass. If a long previous interval of quiescence has elapsed, there may be much solidified lava toward the top of the vent which will restrain the ascent of the still molten portion underneath. A vast pressure is thus exercised on the sides of the cone. Should these be too weak to resist, they will open in one or more rents, and the liquid lava will issue from the outer slope of the mountain; or the energies of the volcano will be directed toward clearing the obstruction in the chief throat, until, with tremendous explosions, and the rise of a vast cloud of dust and fragments, the bottom and sides of the crater are finally blown out, and the top of the cone disappears. The lava may now escape from the lowest part of the lip of the crater, while, at the same time, immense numbers of red-hot bombs, scorix, and stones are shot up into the air, most of them falling back into the crater, but many descending upon the outer slopes of the cone, and some even upon the country beyond the base of the mountain. The lava rushes down at first like one or more rivers of melted



iron, but, as it cools, its rate of motion lessens. Clouds of steam rise from its surface, as well as from the central crater. Indeed, every successive paroxysmal convulsion of the mountain is marked, even at a distance, by the rise of huge ball-like wreaths or clouds of steam, mixed with dust and stones, forming a vast column which towers sometimes a couple of miles above the summit of the cone. By degrees these diminish in frequency and intensity. The lava ceases to flow, the showers of stones and dust dwindle down, and after a time, which may vary from hours to days or months, even in the *régime* of the same mountain, the volcano becomes once more tranquil.

Let us now consider some of the aspects of this action which have more particular geological interests from the permanent changes with which they are connected, or from the way in which they enable us to detect and realize conditions of volcanic energy in former periods.

During the convulsions which culminate in the formation of a volcano, as well as in the subsequent progress of the mountain so formed, the ground at and around the focus of action is liable to be rent open by fissures. These tend to diverge from the focus; but around the vent where the rocks have been most exposed to concussion the fissures sometimes intersect each other in all directions.

Two obvious causes may be assigned for the production of fissures: — (1) the enormous expansive force of the imprisoned vapors acting upon the walls of the funnel and convulsing the cone by successive explosions; and (2) the hydrostatic pressure of the lava-column in the funnel, amounting to about 125 pounds per square inch, or eight tons on the square foot, for each 100 feet of depth. Both of these causes may act simultaneously.

Into the rents thus formed the molten lava naturally finds its way. It is indeed forced into them, and solidifies there like iron in a mold. The cliffs of many an old crater show how marvelously they have been ejected by such *veins* or *dykes* of lava. The dykes project now from the softer tuffs like great walls of masonry. Such wedges of solid rock driven into the cone must widen its dimensions, and at the same time from their length and ramifications must bind the substance of the cone together, and thus strengthen it against the effects of future convulsions. We can understand, therefore, how there should be for a time an alternation in the character of the eruptions of a volcano, depending in great measure upon the relations between the height of the cone on the one hand and the strength of its sides on the other. When the sides have been well braced together by interlacing dykes, and further thickened by the spread of volcanic materials all over their slopes, they may resist the effects of explosion and of the pressure of the ascending lava-column. In this case the volcano may find relief only from its summit, and if the lava flows forth it will do so from the top of the cone. As the cone increases in elevation, however, the pressure from within upon its sides augments. Eventually egress is once more established on the flanks by means of fissures, and a new series of lava-streams is poured out over the lower slopes.

Though lava very commonly issues from the lateral fissures on a volcanic cone, it may sometimes approach the surface without actually flowing out. Again, it frequently happens that minor volcanic cones are thrown up on the line of a fissure. This may arise either from the congelation of the lava round the point of emission, or from the accumulation of ejected scoriæ round the fissure-vent. Of the former structure examples occur in Hawaii, where the lava is remarkably liquid, and rapidly hardens into tears or drops, like wax down the sides of a candle. Where in viscid lavas the steam tears off

and throws up many scoriæ and bombs, a cone of such loose materials will naturally form round the orifice by which the lava escapes from the flank of the mountain.

Although volcanic materials may be erupted to a large extent without the appearance of visible fissures, they cannot in such cases reach the surface without some explosive action, and the consequent displacement and removal of previously existing rock. Vents are thus blown out of the solid crust, the volcanic energy being, as it were, concentrated on a given point, which we may suppose must usually be the weakest in the structure of that part of the crust. The operation has often been observed in volcanoes already formed, and has even been witnessed on ground previously unoccupied by a volcanic vent. The history of the cone of Vesuvius brings before us a long series of such explosions, beginning with that of 79 — the greatest which has occurred within the times of human history — and coming down to the present day.

A communication having been opened, either by fissuring or explosion between the heated interior and the surface, fragmentary materials seldom fail to be ejected from it. These may consist at first mainly of the rocks through which the orifice has been opened, as has just been explained. But if eruptive energy continues, they soon appear in larger quantities, and consist of thoroughly volcanic substances. In a great eruption vast numbers of red-hot stones are shot up into the air, and fall back partly into the crater and partly on the outer slopes of the cone. But instances are known where large stones, ejected obliquely, have described huge parabolic curves in the air, and fallen at a great distance. Stones eight pounds in weight occur among the ashes which buried Pompeii. The volcano of Antuco in Chili is said to send stones flying to a distance of thirty-six miles, and Cotopaxi is reported to have hurled a two-hundred-ton block nine miles.

But in many great eruptions, besides a constant shower of stones and scoriæ, a vast column of exceedingly fine dust rises out of the crater, sometimes to a height of more than a mile, and then spreads outward like a sheet of cloud. So dense sometimes is this dust-cloud that the sun is obscured, and for days together the darkness of night reigns for miles around the volcano. Probably the most stupendous outpouring of volcanic ashes on record was that which took place, after a quiescence of twenty-six years, from the volcano Coseguina, in Nicaragua, during the early part of the year 1835. On that occasion utter darkness prevailed over a circle of thirty-five miles radius, the ashes falling so thickly that, even eight leagues from the mountain, they covered the ground to a depth of about ten feet. It was estimated that the rain of dust and sand fell over an area at least 270 geographical miles in diameter. Some of the finer materials, thrown so high as to come within the influence of an upper air-current, were borne away eastward, and fell four days afterward at Kingston, in Jamaica — a distance of 700 miles.

An inquiry into the origin of these showers of fragmentary materials brings vividly before us some of the essential features of volcanic action. We find that bombs, slags and lapilli may be thrown up in comparatively tranquil states of a volcano, but that the showers of fine dust are discharged with violence, and only appear when the volcano becomes more energetic. Thus, at the constantly, but quietly, active volcano of Stromboli, the column of lava in the pipe may be watched slowly rising and falling with a slow rythmical movement. At every rise the surface of the lava swells up into blisters several feet in diameter, which by and by burst with a



sharp explosion that makes the walls of the crater vibrate. A cloud of steam rushes out, carrying with it hundreds of fragments of the glowing lava, sometimes to a height of 1,200 feet. It is by the ascent of steam through its mass that a column of lava is kept boiling at the bottom of a crater, and by the explosion of successive larger bubbles of steam that the various bombs, slags, and fragments of lava are torn off and tossed into the air. It has often been noticed at Vesuvius that, after each great concussion, a huge ball-like cloud of steam rushes up from the crater. Doubtless it is the sudden escape of that steam which causes the explosion. The violence of the explosion will depend greatly upon the viscosity of the lava, and the consequent resistance offered to the upward passage of the steam. Explosions and accompanying scorix are abundant at Vesuvius, where the lavas are comparatively viscid; they are almost unknown at Kilauea, where the lava is remarkably liquid.

Evidently no part of the operations of a volcano has greater geological significance than the ejection of such enormous quantities of fragmentary matter. In the first place, the fall of these loose materials round the orifice of discharge is one main cause of the growth of the volcanic cone. The heavier fragments gather round the vent, and there too the thickest accumulation of finer dust takes place. Hence, though successive explosions may blow out the upper part of the crater-walls, and prevent the mountain from growing so rapidly in height, every eruption must add to the diameter of the cone. In the second place, as every shower of dust and sand adds to the height of the ground on which it falls, thick volcanic accumulations may be formed far beyond the base of the mountain. In these are entombed trees and other kinds of vegetation, together with the bodies of many animals, as well as the works of man. Hence new geological formations arise which, in their component materials, not only bear witness to the volcanic eruptions which produced them, but preserve a record of the land-surfaces over which they spread. In the third place, besides the distance to which the fragments may be hurled by volcanic explosions, or to which they may be diffused by the ordinary aerial movements, we have to take into account the vast spaces across which the finer dust is sometimes borne by upper currents in the atmosphere. An instance has already been cited where ashes from Coseguina fell 700 miles away, having been carried all that long distance by a high counter-current of air, moving apparently at the rate of about seven miles an hour in an opposite direction to that of the wind which blew at the surface.

A microscopic examination of their intimate structure shows that the lavas have been truly molten rocks. They usually consist fundamentally of a glass through which are diffused, in greater or less abundance, various microlites and crystals. Their degree of liquidity, at the time of emission, seems to depend on the extent to which the rock remains in the condition of glass, viscosity increasing with the development of the microlites and crystals out of the glassy menstruum in which, no doubt, originally their component molecules were diffused. The fluidity may also be governed in no small degree by the amount of vapor existing interstitially in the molten mass. But even where the lava pours forth with a liquidity like that of melted iron, it speedily assumes a more viscid motion, as the process of devitrification advances and the rock is exposed to the chilling effects of radiation and of contact with air and soil. An interesting fact, admirably shown by the microscope, but often easily observable with the naked eye, is that in lava still liquid and mobile well-defined crystals make their appearance. These sometimes are broken during the

continued movement of the surrounding mass, the separated fragments becoming involved in the general glassy base or portions of that base, are injected into the fractures of the crystals.

It was at one time supposed that lava beds could not consolidate on such steep slopes as those of most volcanoes, and that their present inclined position was to be attributed to a central upheaval of each mountain. This idea formed the subject of the famous theory of elevation-craters of L. von Buch, E. de Beaumont, and other geologists. It was a matter of prime importance in the interpretation of volcanic action to have this question settled. To Constant Prevost belongs the merit of having completely exposed the fallacy of this theory. He pointed out that there was no more reason why lavas should not consolidate on steep slopes than that tears or drops of wax should not do so. Mr. Poulett Scrope also showed conclusively that the steep slope of the lava-beds of a volcanic cone was original. Sir Charles Lyell and Mr. Hartung subsequently obtained abundant additional evidence from the Canary Islands, Etna, and other volcanic districts, to disprove the elevation theory. Geologists are now agreed that thick sheets of lava, with all their characteristic features, can consolidate on slopes of even  $35^{\circ}$  and  $40^{\circ}$ .

At its first appearance, where it issues from the mountain, the lava glows with a white heat, and flows with a motion which has been compared to that of honey or of melted iron. It soon becomes red, and, like a coal fallen from a hot fireplace, rapidly grows dull as it moves along, until it assumes a black, cindery aspect. At the same time the surface congeals, and soon becomes solid enough to support a heavy block of stone. A large area which has been flooded with lava is perhaps the most hideous and appalling scene of desolation anywhere to be found on the surface of the globe.

As a rule a lava-stream shows three component layers. At its bottom lies a rough, slaggy mass, produced by the rapid cooling of the lava, and the breaking up and continued onward motion of the scoriform layer. The central and main portion of the stream consists of solid lava, often, however, with a more or less curious and vesicular texture. The upper part, as we have seen, is a mass of rough broken-up slags, scorix, or clinkers. The proportions borne by these respective layers to each other vary continually.

The hardened crust of a lava-stream is a bad conductor of heat. Consequently, when the surface of the mass has become cool enough to be walked upon, the red-hot mass may be observed through the rents to lie only a few inches below. Many years therefore may elapse before the temperature of the whole mass has fallen to that of the surrounding soil.

This extremely slow rate of cooling has justly been regarded as a point of high geological significance in regard to the secular cooling and probable internal temperature of our globe. Some geologists have argued indeed that, if so comparatively small a portion of molten matter as a lava-stream can maintain a high temperature under a thin, cold crust for so many years, we may, from analogy, feel little hesitation in believing that the enormously vaster mass of the globe may, beneath its relatively thin crust, still continue in a molten condition within. More legitimate deductions, however, might be drawn, if we knew more accurately and precisely in each case the rate of loss of heat, and how it varies in different lava-streams.

In its descent a stream of lava may reach a water-course, and, by throwing itself as a great embankment across the stream, may pond back the water and form a lake. Such is the origin of picturesque lake Adiat in



Auvergne. Or the molten current may usurp the channel of the stream, and completely bury the whole valley, as has happened again and again among the vast lava-fields of Iceland. No change in physiography is so rapid and so permanent as this. The channel which has required, doubtless, many thousand of years for the water laboriously to excavate, is sealed up in a few hours under one hundred feet or more of stone, and a still longer interval may elapse before this newer pile is similarly eroded.

In passing from a fluid to a solid condition, and thus contracting, lava acquires different structures. The most characteristic structure among volcanic rocks is the prismatic, or, as it is incorrectly termed, "basaltic." Where this arrangement occurs, as it does so commonly in basalt, the mass is divided into tolerably regular pentagonal, hexagonal, or irregularly polygonal prisms or columns, set close together at a right angle to the main cooling surfaces. These prisms vary from two or three to eighteen or more inches in diameter, and range up to one hundred or even one hundred and fifty feet in length.

By the outpouring of lava two important kinds of geological change are produced. In the first place, the surface of a country is thereby materially changed. Stream-courses, lakes, ravines, valleys, in short all the minor features of a landscape, may be completely overwhelmed under a sheet of lava, one hundred feet or more in thickness. The drainage of the district is thus effectually altered, and all the numerous changes which flow from the operations of running water over the land are arrested and made to begin again in new channels. In the second place, considerable alterations may likewise be caused by the effects of the heat and vapors of the lava upon the subjacent or contiguous ground. Instances have been observed in which the lava has actually melted down opposing rocks, or masses of slags, on its own surface.

But, on the other hand, the exceedingly trifling change produced even by a massive sheet of lava has often been remarked with astonishment.

We have seen that large quantities of water accompany many volcanic eruptions. In some cases, where ancient crater-lakes or internal reservoirs have been shaken by repeated detonations, and finally disrupted, the mud which has thus been produced issues at once from the mountain. Such "mud-lavas," on account of their liquidity and swiftness of motion, are more dreaded for their destructiveness than even the true melted lavas. On the other hand, rain or melted snow, rushing down the cone and taking up loose volcanic dust, is converted into a kind of mud that grows more and more pasty as it descends. The mere sudden rush of such large bodies of water down the steep declivity of a volcanic cone cannot fail to effect much geological change. Deep trenches are cut out of the loose volcanic slopes, and sometimes large areas of woodland are swept away, the debris being strewn over the plains below.

Between the destructive effects of mere water-torrents and that of these mud-floods there is, of course, the notable difference that, whereas in the former case a portion of the surface is swept away, in the latter, while sometimes considerable demolition of the surface takes place at first, the main result is the burying of the ground under a new tumultuous deposit by which the surface is greatly changed, not only as regards its temporary aspect, but in its more permanent features, such as the position and form of its water-courses.

Though probably seldom if ever volcanic in the proper sense of that term, certain remarkable orifices of eruption may be noticed here to which the names of mud-volcanoes, salses, air-volcanoes and macalubas have

been applied. These are conical hills formed by the accumulation of fine and usually saline mud, which, with various gases, is continuously or intermittently given out from the orifice or crater in the center. They occur in groups, each hillock being sometimes less than a yard in height, but ranging up to elevations of 100 feet, or even sometimes, as in the plains of the lower Indus, to 400 feet. Like true volcanoes, they have their periods of repose, when either no discharge takes place at all, or mud oozes out tranquilly from the crater, and their epochs of activity, when large volumes of gas, and sometimes columns of flame, rush out with considerable violence and explosion, and throw up mud and stones to a height of several hundred feet.

The gases play much the same part therefore in these phenomena that steam does in those of true volcanoes. They consist of carbonic acid gas, carbureted hydrogen, sulphureted hydrogen, and nitrogen. The mud is usually cold. In the water occur various saline ingredients, among which common salt generally appears. Naphtha is likewise frequently present. Large pieces of stone, differing from those in the neighborhood, have been observed among the ejections, indicative doubtless of a somewhat deeper source than in ordinary cases. Heavy rains may wash down the minor mud cones and spread out the material over the ground, but gas-bubbles again appear through the sheet of mud, and by degrees a new series of mounds is once more thrown up.

There can be little doubt that these phenomena are to be traced to chemical changes in progress underneath. Doctor Daubeny explained them in Sicily by the slow combustion of beds of sulphur. The frequent occurrence of naphtha and of inflammable gas points, in other cases, to the disengagement of hydrocarbons from subterranean strata.

Some gaseous discharges belong to true volcanic phenomena, others are closely associated with the mud-volcanoes. To the former class we may assign the copious emanations of carbonic acid which so frequently take place in districts where volcanic activity has been long dormant or extinct. The gas either comes out directly from fissures of the rock, or rises dissolved in the water of springs. The old volcanic districts of Europe furnish many examples. Thus on the shores of the Laacher See—an ancient crater lake of the Eifel—carbonic acid gas issues from numerous openings called *moffette*, round which dead insects, and occasionally mice and birds may be found. In the same region occur hundreds of springs more or less charged with the gas. The famous Valley of Death in Java contains one of the most remarkable gas-springs in the world. It is a deep, bosky hollow, from one small space on the bottom of which carbonic acid issues so copiously as to form the lower stratum of the atmosphere. Tigers, deer, and wild-boar, enticed by the shelter of the spot, descend and are speedily suffocated. Many of their skeletons, together with those of man himself, have been observed.

In the second class of gas-springs we may group the emanations of carbureted hydrogen, which, when they take fire, are known as Fire-wells. They occur in many of the districts where mud-volcanoes appear, as in northern Italy, on the Caspian, in Mesopotamia, in southern Kurdistan, and in many parts of the United States. It has been observed that they rise especially in regions where beds of rock-salt lie underneath, and as that rock has been ascertained often to contain compressed carbureted hydrogen, the solution of the rock by subterranean water, and the consequent liberation of the gas, has been offered as an explanation of these fire-wells.

In various regions where volcanic action still contin-



ues, or where it has long been dormant, there occur eruptive fountains of hot water and steam, to which the general name of geysers is given, from the well-known examples in Iceland, which were the first to be seen and described. Besides the Great and Little Geysers, the Strokkur, and other minor springs of hot water in Iceland, other, perhaps still more striking, examples have been brought to light in that tract of the Western Territories of the United States set aside as the "Yellowstone National Park," and good illustrations are also found in New Zealand. A geyser possesses a vertical pipe in the ground, terminating at the surface in a basin which is formed of siliceous sinter, and may rise some feet or yards above the general level. At more or less regular intervals rumblings and sharp detonations occur underneath, followed by an agitation of the water in the basin, and then by the violent expulsion of a column of water and steam to a considerable height in the air. The hot water contains silica in solution, which, on cooling and evaporating, is deposited at the surface; and thus the geyser builds up its basin, sometimes raising it into a long, solitary, finger-like pillar.

It is not only on the surface of the land that volcanic action shows itself. It takes place likewise under the sea, and as the geological records of the earth's past history are chiefly marine formations, the characteristics of submarine volcanic action have no small interest to the geologist. Unfortunately, the phenomena of recent volcanic eruptions under the sea are for the most part inaccessible.

(1) Volcanoes occur along the margins of the ocean basins, particularly along lines of dominant mountain ranges. The vast hollow of the Pacific is girdled with a wide ring of volcanic foci. (2) They rise as a striking feature in the heart of the ocean basins. Most of the oceanic islands are volcanic. Even the coral islands have in all likelihood been built upon the tops of submarine volcanic cones. (3) Volcanoes are thus situated, as a rule, close to the sea. When they occur inland they sometimes appear in the neighborhood of a large sheet of water. Yet so many instances have been observed where volcanoes have appeared at great distances from any sheet of water that the proximity of a lake or of the sea cannot be regarded as necessary for the evolution of volcanic phenomena.

Besides the existence of what are called extinct volcanoes, the geologist can adduce proofs of the former presence of active volcanoes in many countries where cones and craters and all ordinary aspects of volcanic mountains have long disappeared. Sheets of lava, beds of tuff, dykes, and necks representing the sites of volcanic vents have been recognized abundantly. These manifestations of volcanic action, moreover, have as wide a range in geological time as they have in geological area. Every great geological period, back at least as far as the Lower Silurian, has had its volcanoes.

It can be shown that, within the same comparatively limited geographical space, volcanic action has been rife at intervals during a long succession of geological ages. The existing active volcanoes of Iceland rise from amid Tertiary lavas and tuffs, which form part of a great volcanic ridge, extending down through the Farøe Islands into the west of Britain. Volcanic action, which now manifests itself so conspicuously along certain lines, seems to have continued in that linear development for protracted periods of time. The actual vents have changed, dying in one place and breaking out in another, yet keeping on the whole along the same lines.

Volcanoes depend, of course, upon the internal heat of the planet as their prime source of energy. But the *modus operandi* whereby that internal heat manifests itself in volcanic action is a problem by no means of easy

solution. Were this action merely an expression of the intensity of the heat, we might expect it to have manifested itself in a far more powerful manner in former periods, and to exhibit a regularity and continuity commensurate with the exceedingly slow diminution of the earth's temperature. But there is no geological evidence in favor of greater volcanic intensity in ancient times than in more recent periods; on the contrary, it may be doubted whether any of the Palæozoic volcanoes equaled in magnitude those of the Tertiary period, or whether any of the latter ever produced such stupendous changes as have been effected by modern volcanoes still active. On the other hand, no feature of volcanic action is more conspicuous than its spasmodic fitfulness.

The mere presence of a high internal temperature, therefore, would probably not of itself produce the phenomena of volcanoes, at least in the present condition of the planet. There can be no doubt that one essential exciting cause of volcanic action is the descent of water from the surface. It has already been pointed out how invariably steam plays a chief part in volcanic eruptions, how it issues in vast clouds from the crater, and continues to rise copiously from the lava even after the molten rock has traveled for some miles, and has assumed a solid surface. The quantity of water which descends into the interior must be enormous. The floor of the sea, the beds of rivers and lakes, are all leaky. Of the annual rain which sinks beneath the surface of the land, we cannot tell what proportion is detained and prevented from rising again in springs. Not only does this subterranean water percolate down cracks and joints, it infiltrates through the very pores of the rocks, and can do so even against the pressure of steam on the further side.

Accordingly, there has arisen a very prevalent belief among geologists, that it is to the enormous expansive force of perhaps white-hot water finding access to, and imprisoned in, some of the heated empty spaces at the roots of volcanoes that the explosions of a crater and the subsequent rise of a lava-column are due. It has been supposed that, somewhat like the reservoirs in which the hot water and steam accumulate under the Icelandic geysers, these volcanic spaces receive a constant influx of water from the surface, which cannot escape by other channels, but is in great part converted into vapor or retained in the fluid state at an enormously high temperature and under vast pressure. In the course of time, the materials filling up the chimney are unable to withstand the upward expansion of this imprisoned vapor and water, so that, after some premonitory rumblings, the whole opposing mass is blown out, and the vapor rushes up in the well-known masses of cloud. Meanwhile, the removal of the overlying column relieves some of the pressure from the water-charged lava, which therefore begins to rise in the funnel until it forces its way through some weak part of the cone, or pours over the top of the crater. After a time the vapor is expended, the energy of the volcano ceases, and there comes a variable period of repose, until a renewal of the same phenomena brings on another eruption. By such successive paroxysms it is supposed that the form of the internal reservoirs and tunnels become changed; new spaces for the accumulation of superheated water are formed, whence in time new volcanic vents issue, while the old ones gradually die out.

As physical considerations negative the idea of a comparatively thin crust surmounting a molten interior whence volcanic energy might be derived, geologists have found themselves involved in great perplexity to explain volcanic phenomena for the production of which a source of no great depth would seem to be



necessary. They have supposed the existence of pools or lakes of liquid lava lying beneath the crust, and at an inconsiderable depth from the surface. They have sometimes appealed to the influence of the contraction of the earth's mass, assuming that the contraction is greater in the outer than in the inner portions, and that the effect of this must be to squeeze out some of the internal molten matter through weak parts of the crust.

### *Earthquakes.*

The phenomena of earthquake-motion have been discussed in the article EARTHQUAKES. Only those which have a marked geological importance from the way in which they affect the crust or surface of the earth will be noticed here.

### *Secular Upheaval and Depression.*

Besides the sudden movements due to earthquake-shocks, the crust of the earth undergoes in many places oscillations of an extremely quiet and uniform character, sometimes of an elevatory, sometimes of a subsiding nature. So tranquil are these changes that they produce from day to day no appreciable alteration in the aspect of the ground affected. Only after the lapse of several generations, and by means of careful measurements, can they really be proved. Indeed, in the interior of a country nothing but a series of accurate levelings from some unchanged datum-line might detect the change of level, unless the effects of this terrestrial movement showed themselves in altering the drainage. It is only along the sea-coast that a ready measure is afforded of any such movement. In popular language it is usual to speak of the sea as rising or sinking relatively to the land. But so long as the volume of the ocean remains the same, the general sea-level can neither rise nor fall, unless by some movement of the solid globe underneath it. And, as we cannot conceive of any possible augmentation of the oceanic waters, nor of any diminution save what may be due to the extremely slow process of abstraction by the hydration of minerals, or absorption into the earth's interior, we are compelled to regard the sea-level as practically a constant datum-line, any deviation from which, in the apparent heights of sea and land, must be due to movement of the land and not of the sea.

*Movements of Upheaval.*—Various maritime tracts of the land have been ascertained to have undergone in recent times, or to be still undergoing, a gradual elevation above the sea. Thus, the coast of Siberia, for 600 miles to the east of the river Lena, the western tracts of South America, and the Scandinavian peninsula, with the exception of a small area at its southern apex, have been proved to have been recently upheaved. The proofs of this change of level chiefly to be relied on are the following:

The position of rocks covered with barnacles or other littoral adherent animals, or pierced by lithodamous shells. A single stone with these creatures on its surface would not necessarily prove anything, for it might be cast up by a storm; but a line of large boulders, which had evidently not been moved since the cirripedes and mollusks lived upon them, and still more a solid cliff with these marks of littoral or sub-littoral life upon its base, now raised above high-water mark, would be sufficient to demonstrate a rise of land. The amount of the upheaval might be pretty accurately determined by measuring the vertical distance between the upper edge of the barnacle zone upon the upraised rock, and the limit of the same zone on the present shore.

A line of sea-caves, now standing at a distance above high water-mark beyond the reach of the sea, would afford evidence of recent uprise, since caves of this kind

are only hollowed out by the waves between tide-marks.

One of the most striking proofs of upheaval is furnished by what are termed *raised beaches*. A beach is the space between the tide-marks, where the sea is constantly busy producing sand and gravel, mingling with them the remains of shells and other organisms, sometimes piling the deposits up, sometimes sweeping them away out into the open water. The terrace or platform thus formed is a well-marked feature of coast-lines skirting tidal seas. When the land rises with sufficient rapidity to carry up the line of littoral deposits above the reach of the waves, the flat terrace thus elevated is known as a raised beach. The former high-water mark then lies inland, and while its sea-worn caves are in time hung with ferns and mosses, it furnishes itself an admirable platform, on which meadows, fields, and gardens, roads, houses, villages, and towns spring up, while a new beach is made below the margin of the uplifted one. Raised beaches abound around many parts of the coast-line of Britain. Some excellent examples occur in Cornwall and Devon. The coast-line on both sides of Scotland is fringed with raised beaches, sometimes four or five occurring above each other, at heights of twenty-five, forty, sixty, seventy-five and one hundred feet above the present high-water mark. Each terrace marks a former lower level of the land with regard to the sea, and probably a lengthened stay of the land at that level, while the intervals between them represent the vertical amount of each successive uplift of the land, and show that the land in its upward movement did not remain long enough at intermediate points for the formation of terraces. A succession of raised beaches, rising above the present sea-level, may therefore be taken as pointing to a former prolonged upheaval of the country, interrupted by long pauses, during which the general level did not materially change.

Any stratum of rock containing marine organisms, which have manifestly lived and died where their remains now lie, must be held to prove upheaval of the land.

In countries which have been long settled by a human population, it is sometimes possible to prove, or at least to render probable, the fact of recent uprise of the land by reference to tradition, to local names, and to works of human construction.

*Movements of Subsidence.*—It is more difficult to trace the downward movement of the land, for the evidence of each successive sea-margin is carried down and washed away or covered up. Nevertheless, the fact of subsidence can be satisfactorily established by the following proof:

The results of mere erosion by the sea and those of actual depression of the land cannot always be distinguished without some care. The encroachment of the sea upon the land, involving, it may be, the disappearance of successive fields, roads, houses, villages, and even whole districts, does not necessarily indicate a sinking of the land. Such destruction of the coast-line may, indeed, be in progress without any actual change of level. Should the sea, however, rise to the level of roads and buildings which it never used to touch, should former half-tide rocks cease to show even at low water, and should rocks, previously above the reach of the highest tide, be turned first into shore reefs, then into skerries and islets, we infer that the coast-line is sinking. Such kind of evidence is found in Scania, the most southerly part of Sweden. Streets, built of course above high-water mark, now lie below it, with older streets lying beneath them, so that the subsidence is of some antiquity. A stone, the position of which had



been exactly determined by Linnæus in 1749, was found after eighty-seven years to be one hundred feet nearer the water's edge. The west coast of Greenland, for a space of more than six hundred miles, is perceptibly sinking. It has there been noticed that, over ancient buildings on low shores, as well as over entire islets, the sea has risen. The Moravian settlers have been more than once driven to shift their boat-poles inland, some of the old poles remaining visible under water.

These movements, without question, we must again trace back to consequences of the original internal heat of the earth. There are various ways in which the heat may have acted. Thus a considerable accession of heat causes them to contract. We may suppose, therefore, that, during the subterranean changes, a great extent of the crust underneath a tract of land may have its temperature slowly raised. The effect of this increment would be to cause a slow uprise of the ground above. The gradual transference of the heat to another quarter might produce a steady subsidence. Such variations in subterranean temperature, however, could give rise at the most to but very insignificant elevations or depressions.

A far more important and generally effective cause is to be sought in the secular contraction of the globe. If our planet has been steadily losing heat by radiation into space, it must have progressively diminished in volume. The cooling implies contraction. According to Mr. Mallet, the diameter of the earth is less by at least 189 miles since the time when the planet was a mass of liquid. But the contraction has not manifested itself uniformly over the whole surface of the planet. The crust varies much in structure, in thermal resistance, and in the position of its isogeothermal lines. As the hotter nucleus contracts more rapidly by cooling than the cooled and hardened crust, the latter must sink down by its own weight, and in so doing requires to accommodate itself to a continually diminishing diameter. The descent of the crust gives rise to enormous tangential pressures. The rocks are crushed, crumbled and broken in many places. Subsidence must have been the general rule, but every subsidence would doubtless be accompanied with upheavals of a more limited kind. The direction of these upheaved tracts would largely depend upon the original structure of the crust. It would be apt to occur in lines which, once taken as lines of weakness or relief from the intense strain, would probably be made use of again and again at successive paroxysms or more tranquil periods of contraction. Mr. Mallet has ingeniously connected these movements with the linear direction of mountain chains, volcanic vents and earthquake shocks.

#### *Hypogene Causes of Changes in the Texture, Structure and Composition of Rocks.*

The phenomena of hypogene action hitherto under consideration have related almost wholly to the effects produced at the surface. It is evident, however, that these phenomena must be accompanied by very considerable changes in the rocks which form the earth's outer crust. These rocks, as just stated, have been subjected to enormous pressure; they have been contorted, crumpled, and folded back upon themselves, as if thousands of feet of solid limestones, sandstones and shales had been merely a few layers of carpet; they have been shattered and fractured everywhere; they have in one place been pushed far above their original position, in another depressed far beneath it: so great has been the compression which they have undergone that their component particles have in many places been rearranged, and even crystallized. They have here and there actually been

reduced to fusion, and have been abundantly invaded by masses of molten rock from below.

It is evident that we can hardly hope to detect many of these processes of subterranean change actually in progress and watch their effects. The very vastness of some of them places them beyond our direct reach, and we can only reason regarding them from the changes which we see them to have produced. But a good number are of a kind which we can in some measure imitate in our laboratories and furnaces. It is not requisite, therefore, to speculate wholly in the dark on this subject. Since the original and classic researches of Sir James Hall, the founder of experimental geology, great progress has been made in the investigation of hypogene processes by experiment. The conditions of nature have been imitated as closely as possible, and varied in different ways, with the result of giving us an increasingly clear insight into the physics and chemistry of subterranean geological changes.

### STRUCTURAL GEOLOGY.

#### OR THE ARCHITECTURE OF THE EARTH'S CRUST.

Since by far the largest portion of the crust consists of sedimentary or aqueous rocks, it will be of advantage to treat of them first, noting, in the first place, their original characters as resulting from the circumstances under which they were formed, and afterward, the modifications subsequently effected upon them. Many of these superinduced structures, which are not peculiar to sedimentary, but occur more or less markedly in all rocks, may be conveniently described together. The distinctive characters of the igneous or eruptive rocks, as portions of the architecture of the crust, will then be described; and lastly, those of the crystalline schists and other associated rocks to which the name of metamorphic is usually applied.

The term "stratified," so often applied as a general designation to the aqueous or sedimentary rocks, expresses their leading structural feature. They are arranged in layers or strata, an arrangement characteristic of them alike in hand-specimens and in the cliffs of mountains. Not that every morsel of aqueous rock exhibits evidence of stratification. But it is this characteristic which is least frequently absent. The general aspects of stratification will be best followed in an explanation of the terms by which they are expressed.

*Laminæ* are the thinnest paper-like layers of deposit in a stratified rock. Such fine layers only occur where the material is fine-grained, as in mud or shale, or where fine scales of some mineral have been plentifully deposited, as in micaceous sandstone. In some laminated rocks the laminæ cohere so firmly that they can hardly be split open, and the rock will break more readily across them than in their direction. More usually, however, the planes of lamination serve as convenient divisional planes by means of which the rock can be split open. The frequency with which laminæ can be separated from each other, indicating, as it does, a failure of coherence between the layers of deposit, may probably be taken as a proof that these layers were originally laid down at intervals of sufficient duration to admit of a considerable amount of consolidation of one layer before the deposition of the next. It is quite possible that in many, if not in most cases, these intervals were of longer duration than those required for the successive deposit of the laminæ. In estimating therefore the length of time represented by say one foot of such finely laminated rock, we might reasonably regard the actual time occupied in deposition as only a small fraction of the whole interval.

The existence of laminæ points to tranquil conditions



of slow intermittent deposit. The sediment has been borne at intervals and fallen over the same area of undisturbed water. Regularity of thickness and persistence of lithological character among the laminæ may be taken to indicate periodic currents, of approximately equal force, from the same quarter. In some cases successive tides in a sheltered estuary may have been the agent of deposition. In others the sediment was doubtless brought by recurring river-floods. A great thickness of laminated rock, like the massive shales of Palæozoic formations, points to a prolonged period of quiescence, and probably, in most cases, to slow, tranquil subsidence of the sea-floor. On the other hand, the alternation of thin bands of laminated rock with others coarser in texture and non-laminated suggests considerable oscillation of currents from different quarters bearing different qualities and amounts of sediment.

*Strata* or *Beds* are layers of rock varying from an inch or less up to many feet in thickness. A stratum may be made up of many laminæ, if the nature of the sediment and mode of deposit have favored the production of this structure. This has very commonly been the case where the sediment has been exceedingly fine-grained. Where the materials are of coarser grain, the strata, as a rule, are not laminated, but form the thinnest parallel divisions of the mass of rock. Strata, like laminæ, may either cohere firmly, or, as more usually happens, be separable with more or less ease from each other. In the former case we may suppose the upper to have followed the lower bed without the lapse of an interval long enough to allow of the consolidation of the latter. The common merging of a stratum into that which overlies it must no doubt be regarded as evidence of more or less gradual change in the conditions of deposit. Where the overlying bed shows no cohesion with that below it, the interval was probably of some duration. A stratum may be one of a series of similar beds in the same mass of rock. Thus a thick sandstone consists of many individual strata, varying it may be very considerably in their respective thicknesses. Or a stratum may be complete and distinct in itself, as where one of limestone or ironstone runs through the heart of a series of shales. As a general rule we may conclude that wherever among sedimentary accumulations stratification is exceedingly well-marked, the rocks were formed rather slowly, and that where it is weak or absent the conditions of deposit were more rapid, without the intervals and changes necessary for the production of the distinctly stratified structure.

*Order of Superposition—the Foundation of Geological Chronology.*—As sedimentary strata are laid down upon one another in a more or less nearly horizontal position, the underlying beds must be older than those which cover them. This simple and obvious truth is termed the law of superposition. It furnishes the means of determining the chronology of rocks, and though other methods of ascertaining this point are employed, they must all be based originally upon the observed order of superposition. The only case where the apparent superposition may be deceptive is where the strata have been inverted. In the Alps, for example the rocks composing huge mountain masses have been so completely overturned that the highest beds appear as if regularly covered by others which ought properly to underlie them. But these are exceptional occurrences, where the true order can usually be made out from other sources of evidence.

*Alternations of Strata.*—Though great variations occur in the nature of the strata composing a mass of sedimentary rocks, it may often be observed that certain repetitions occur. Sandstones, for example, are found to be interlaved with shale above, and then to pass

into shale; the latter may in turn become sandy at the top and be finally covered by sandstone, or may assume a calcareous character and pass up into limestone. Such alternations bring before us the conditions under which the sedimentation took place. A sandstone group indicates water of comparatively little depth, moved by changing currents, bringing the sand now from one side now from another. The passage of such a group into one of shale points to a diminution in the motion and transporting power of the water, perhaps to a sinking of the tract, whereby only fine mud was then intermittently brought into it. The advent of a limestone above the shale serves to show that the water cleared, owing to a deflexion of the sediment-carrying currents, or to continued and perhaps more rapid subsidence, and that *Foraminifera*, corals, crinoids, *Mollusca*, or other lime-secreting organisms, establish themselves upon the spot. Shale overlying the limestone would tell of fresh inroads of mud, which destroyed the animal life that had been flourishing on the bottom; while a return of sandstone beds would mark how, in the course of time, the original conditions of troubled currents and shifting sandbanks returned. Such alternating groups of sandy, calcareous, and argillaceous strata are well illustrated among the Jurassic formations of England.

*Associations of Strata.*—Certain kinds of strata very commonly occur together, because the conditions under which they were formed were apt to arise in succession. One of the most familiar examples is the association of coal and fire-clay. A seam of coal is almost invariably found to lie on a bed of fire-clay, or on some argillaceous stratum. The reason of this union becomes at once apparent when we learn that the fire-clay formed the soil on which the plants grew that went to form the coal. Where the clay was laid down under suitable circumstances vegetation sprang up upon it. Again, conglomerate and sandstone occur together rather than conglomerate and shale, because the agitation of the water which could form and deposit coarse detritus, like that composing conglomerate, was too great to admit of the accumulation of fine silt. For a similar reason we may look for shale or clay rather than sandstone as an accompaniment of limestone.

*Relative Lapse of Time represented by Strata and by the Intervals between them.*—Of the absolute length of time represented by any strata or groups of strata we can form no satisfactory estimates. Certain general conclusions may indeed be drawn, and comparisons may be made between different series of rocks. Sandstones full of false-bedding were probably accumulated more rapidly than finely-laminated shales or clays. It is not uncommon in certain Carboniferous formations to find huge coniferous trunks imbedded in an inclined position in sandstone. These trees seem to have been carried along and to have sunk, their heavier or root-end touching the bottom, and their upper end pointing upward in the direction of the current, exactly as in the case of the snags of the Mississippi. The continuous deposit of sand at last rose above the level of the trunks and buried them. It is clear then that the rate of deposit must have been sufficiently rapid to have allowed a mass of twenty or thirty feet of sand to accumulate before the decay of the wood; though modern instances are known where, under certain circumstances, submerged trees may last for some centuries. Continuous layers of the same kind of deposit suggest a persistence of geological conditions; numerous alternations of different kinds of sedimentary matter point to vicissitudes or alternations of conditions. As a rule, we should infer that the time represented by a given thickness of similar strata was less than that shown by the same thickness



of dissimilar strata, because the changes needed to bring new varieties of sediment into the area of deposit would usually require the lapse of some time for their completion. But this conclusion might often be erroneous. It would be best supported when, from the very nature of the rocks, wide variations in the character of the water-bottom could be established. Thus a group of shales followed by a fossiliferous limestone would almost always mark the lapse of a much longer period than an equal depth of sandy strata. Limestones made up of organic remains which lived and died upon the spot, and whose remains are crowded together generation above generation, must have demanded many years for their formation.

It is by the remains of plants and animals imbedded among the stratified rocks that the most satisfactory subdivisions of the geological record can be made. A chronological succession of organic forms can be made out among the rocks of the earth's crust. A certain common facies or type of fossils is found to characterize particular groups of rock, and to hold true even though the lithological constitution of the strata should greatly vary. Moreover, though comparatively few species are universally diffused, they possess remarkable persistence over wide areas, and even when they are replaced by others, the same general facies of fossils remains. Hence the stratified formations of two countries geographically distant, and having little or no lithological resemblance to each other, may be compared and paralleled zone by zone, simply by means of their inclosed organic remains.

#### PALÆONTOLOGICAL GEOLOGY.

Palæontology is the science which treats of the structure, affinities, classification, and distribution in time of the forms of plant and animal life embedded in the rocks of the earth's crust. In one sense it may be regarded as a branch of zoölogy and of botany, its claim in this view to rank as a separate science resting almost solely on the fact that of the forms with which it deals but a small proportion belongs to the living world. In another aspect it may be looked upon as a branch of geology, seeing that its assistance is absolutely indispensable in many of the most familiar and fundamental problems of the latter science. It is under this last aspect that we have to regard it here. We shall consider merely those leading features of palæontological inquiry without some knowledge of which progress in modern geology would be impossible.

*Fossils.*—Palæontological geology, then, deals with the fossils or organic remains preserved in the rocks, and endeavors to gather from them information as to the history of the globe and its inhabitants. The term "fossil," meaning literally anything "dug up," was formerly applied indiscriminately to any mineral substance taken out of the earth's crust, whether organized or not. Ordinary minerals and rocks were thus included as fossils. For many years, however, the meaning of the word has been restricted, so as to include only the remains or traces of plants and animals preserved in any natural formation, whether hard rock or superficial deposit. The idea of antiquity or relative date is not necessarily involved in this conception of the term. Thus the bones of a sheep buried under gravel and silt by a modern flood, and the obscure crystalline traces of a coral in ancient masses of limestone, are equally fossils.

Nor has the term fossil any limitation as to organic grade. It includes not merely the remains of organisms, but also whatever was directly connected with or produced by these organisms. Thus the resin which was exuded from trees of long-perished forests is as much a

fossil as any portion of the stem, leaves, flowers, or fruit, and in some respects is even more valuable to the geologist than more determinable remains of its parent trees, because it has often preserved in admirable perfection the insects which flitted about in the woodlands. The burrows and trails of a worm preserved in sandstone and shale claim recognition as fossils, and indeed are commonly the only indications to be met with of the existence of annelide life among old geological formations. The droppings of fishes and reptiles, called coprolites, are excellent fossils, and tell their tale as to the presence of vertebrate life in ancient waters.

The term fossil, moreover, suffers no restriction as to the condition or state of preservation of any organism. In some rare instances the very flesh, skin, and hair of a mammal have been preserved for thousands of years, as in the case of the mammoths entombed within the frozen mud cliffs of Siberia.

#### *Conditions for the Preservation of Organic Remains.*

—At the outset the question naturally suggests itself how the remains of plants and animals come to have been preserved in rocks at all. If we observe what takes place at the present day, and argue that it may fairly be taken as an indication of what has been the ordinary condition of things in the geological past, we see that there must have been so many chances against the conservation of either animal or plant remains that their occurrence among stratified formations should be regarded as exceptional, and as the result of various fortunate accidents.

I. Consider, in the first place, what chances exist for the preservation of remains of the present fauna and flora of a country. The surface of the land may be densely clothed with forest, and abundantly peopled with animal life. But the trees die and molder into soil. The animals, too, disappear, generation after generation, and leave no perceptible traces of their existence. If we were not aware from authentic records that central and northern Europe was covered with vast forests at the beginning of our era, how could we know this fact? What has become of the herds of wild oxen, the bears, wolves, and other denizens of primeval Europe? How could we prove from the examination of the surface soil of any country that those creatures had once abounded there? We might search in vain for any such superficial traces, and would learn by so doing that the law of nature is everywhere "dust to dust."

The considerations for the preservation of any relics of the plant and animal life of a terrestrial surface must therefore be always exceptional. They are supplied only where the organic remains can be protected from the air and superficial decay. Hence they may be observed in

*Lakes.*—Over the floor of a lake deposits of silt, peat, marl, etc., are formed. Into these the stems, branches, leaves, flowers, fruits, or seeds of plants from the neighboring land may be carried, together with the bodies of land animals, insects and birds. An occasional storm may blow the lighter debris of the woodlands into the water. Such portions of the wreck as did not float, and were not washed ashore again, might sink to the bottom. Of these the larger part would in most cases probably rot away, so that, in the end, only a very small fraction of the whole vegetable matter cast over the lake by the wind would be covered up and preserved at the bottom. In like manner the animal remains swept by winds or by river floods into the lake would run so many risks of dissolution that only a proportion of them, and probably merely a small proportion, would be preserved. When we consider these chances against the conservation of the vegetable and animal life of the land, we must admit that, at the best,



lake-bottoms can contain but a meager and imperfect representation of the abundant life of the adjacent hills and plains.

But lakes have a distinct flora and fauna of their own. Their aquatic plants may be entombed in the gathering deposits of the bottom. Their mollusks, of characteristic types, sometimes form, by the accumulation of their remains, sheets of soft calcareous marl, in which many of the undecayed shells are preserved. Their fishes, likewise distinctly lacustrine, no doubt must often be entombed in the silt or marl.

*Peat-mosses.*—Wild animals venturing on the more treacherous watery parts of a peat-bog are sometimes ingulfed or "laired." The antiseptic qualities of the peat preserve such remains from decay. Hence from European peat-mosses numerous remains of deer and oxen have been exhumed. Evidently the larger beasts of the forest ought chiefly to be looked for in these localities.

*Caverns.*—These are eminently adapted for the preservation of the higher forms of terrestrial life. Most of our knowledge of the prehistoric mammalian fauna of Europe is derived from what has been disinterred from *bone-caves*. As these recesses lie for the most part in limestone or in calcareous rock, their floors are commonly coated with stalagmite from the drip of the roof; and as this deposit is of great closeness and durability it has effectually preserved whatever it has covered or enveloped. The caves have in many instances served predatory beasts, like the hyæna, cave-lion, and cave-bear, as dens in which they slept, and into which some of them dragged their prey. In other cases they have been merely holes into which different animals crawled to die, or into which they fell or were swept by inundations. Under whatever circumstances the animals left their remains in these subterranean retreats, the result has been that the bones have been covered up and preserved. Still, we must admit that after all but a mere fraction even of the mammals of the time would enter the caves, and therefore that the evidence of the cavern-deposits, profoundly interesting and valuable as it is, presents us with merely a glimpse of one aspect of the life of the land.

In the next place, if we turn to the sea, we find certainly many more favorable conditions for the preservation of organic forms, but also many circumstances which operate against it. While the level of the land remains stationary, there can be but little effective entombment of marine organisms in littoral deposits; for only a limited accumulation of sediment will be formed until subsidence of the sea-floor takes place. In the trifling beds of sand or gravel thrown up on a stationary shore, only the harder and more durable forms of life, such as gasteropods and lamellibranchs, which can withstand the triturating effects of the beach waves, are likely to remain uneffaced.

Below tide-marks, along the margin of the land where sediment is gradually deposited, the conditions are favorable for the preservation of marine organisms. Sheets of sand and mud are there laid down. In those sediments the harder parts of many forms of life may be entombed and protected from decay. But only a small portion of the total marine fauna may be expected to occur in such deposits. At the best, merely littoral and shallow-water forms will occur, and even under the most favorable conditions they will represent but a fraction of the whole assemblage of life in these juxta-terrestrial parts of the ocean. As we recede from the land the rate of deposition of sediment on the sea-floor must become feebler, until in the remote central abysses it reaches a hardly appreciable minimum. Except, therefore, where organic deposits, such as ooze, are

forming in these more pelagic regions, the conditions must be on the whole unfavorable for the preservation of any adequate representation of the deep-sea fauna. Hard, enduring objects, such as teeth and bones, may slowly accumulate and be protected by a coating of peroxide of manganese, or of some of the silicates above referred to as now forming here and there over the deep sea-bottom. But such a deposit, if raised into land, would supply but a meager picture of the life of the sea.

We must conclude therefore that of the whole sea-floor the area best adapted for preserving a varied suite of marine organic exuvæ is that belt which, running along the margin of the land, is ever receiving fresh layers of sediment transported by rivers and currents from the adjacent shores. The most favorable conditions for the accumulation of a thick mass of marine fossiliferous strata will arise when the area of deposit is undergoing a gradual subsidence. If the rate of depression and that of deposit were equal, or nearly so, the movement might proceed for a vast period without producing any great apparent change in marine geography, and even without seriously affecting the distribution of life over the sea-floor within the area of subsidence. Hundreds or thousands of feet of sedimentary strata might in this way be heaped up round the continents, containing a fragmentary series of organic remains belonging to those forms of shallow-water life which had hard parts capable of preservation.

There can be little doubt that such has in fact been the history of the main mass of stratified formations in the earth's crust. These piles of marine strata have unquestionably been laid down in comparatively shallow water within the area of deposit of terrestrial sediment. Their great depth seems only explicable by prolonged and repeated movements of subsidence, interrupted, however, as we know, by other movements of a contrary kind. These geographical changes affected at once the deposition of inorganic materials and the succession of organic forms. One series of strata is sometimes abruptly succeeded by another of a very different character, and we generally find a corresponding contrast between their respective organic contents.

*Relative Value of Organic Remains as Fossils.*—As the conditions for the preservation of organic remains exist more favorably under the sea than on land, marine organisms must be far more abundantly conserved than those of the land. This is true to-day, and has been true in all past geological time. Hence for the purposes of the geologist the fossil remains of marine forms of life far surpass all others in value. Among them there will necessarily be a gradation of importance regulated chiefly by their relative abundance. Now, of all the marine tribes which live within the juxta-terrestrial belt of sedimentation, unquestionably the *Mollusca* stand in the place of preëminence as regards their aptitude for becoming fossils. In the first place they almost all possess a hard durable shell, capable of resisting considerable abrasion, and readily passing into a mineralized condition. In the next place they are extremely abundant both as to individuals and genera. They occur on the shore within tide mark, and range thence down into the abysses. Moreover, they appear to have possessed those qualifications from early geological times. In the marine *Mollusca*, therefore, we have a common ground of comparison between the stratified formations of different periods. They have been styled the alphabet of palæontological inquiry.

Looking at the organisms of the land, we perceive that, as a rule, the abundant terrestrial flora has a comparatively small chance of being well represented



In a fossil state, that indeed, as a rule, only that portion of it of which the leaves, twigs, flowers, and fruits are blown into lakes is likely to be partially preserved. Terrestrial plants, therefore, occur in comparative rarity among stratified rocks, and furnish in consequence only limited means of comparison between the formations of different ages and countries. Of land animals the vast majority perish and leave no permanent trace of their existence. Predatory and other forms whose remains may be looked for in caverns or peat-mosses, must occur more numerous in the fossil state than birds, and are correspondingly more valuable to the geologist for the comparison of different strata.

*Relative Age of Fossils.*—Although absolute dates cannot be fixed in geological chronology, it is not difficult to determine the relative age of different strata, and consequently of their inclosed organic remains. For this purpose the fundamental law is based on what is termed the "order of superposition." This law may be thus defined: in a series of stratified formations the older must underlie the younger. It is not needful that we should actually see the one lying below the other. If a continuous conformable succession of strata dips steadily in one direction we know that the beds at the one end must underlie those at the other, because we can trace the whole succession of beds between them. Rare instances occur where strata have been so folded by great terrestrial disturbance that the younger are made to underlie the older. But this inversion can usually be made quite clear from other evidence. The true order of superposition is decisive of the relative ages of stratified rocks.

*Uses of Fossils in Geology.*—There are two main purposes to which fossils may be put in geological research:—(1) to throw light upon former conditions of physical geography, such as the presence of land, rivers, lakes, and seas, in places where they do not now exist, changes of climate, and the former distribution of plants and animals; and (2) to furnish a guide in geological chronology whereby rocks may be classified according to relative date and the facts of geological history may be arranged and interpreted as a connected record of the earth's progress.

*Subdivisions of the Geological Record by means of Fossils.*—As fossil evidence furnishes a much more satisfactory and widely applicable means of subdividing the stratified rocks of the earth's crust than mere lithological characters, it is made the basis of the geological classification of these rocks. Thus we may find a particular stratum marked by the occurrence in it of various fossils, one or more of which may be distinctive, either from occurring in no other bed above and below, or from special abundance in that stratum. These species might therefore be used as a guide to the occurrence of the bed in question, which might be called by the name of the most abundant species. In this way a geological horizon or zone would be marked off, and geologists would thereafter recognize its exact position in the series of formations. But before such a generalization can be safely made, we must be sure that the species in question really never does appear on any other platform. This evidently demands wide experience over an extended field of observation. The assertion that a particular species occurs only on one horizon manifestly rests on negative evidence as much as on positive. The palæontologist who makes it cannot mean more than that he knows the fossil to lie on that horizon, and that, so far as his own experience and that of others goes, it has never been met with anywhere else. But a single example of the occurrence of the fossil on a different zone would greatly damage the value of his generalization, and a few such cases would demolish it altogether. Hence all such

statements ought at first to be made tentatively. To establish a geological horizon on limited fossil evidence, and then to assume the identity of all strata containing the same fossils, is to reason in a circle and to introduce utter confusion into our interpretation of the geological record. The first and fundamental point is to determine accurately the order of superposition of the strata. Until this is done detailed palæontological classification may prove to be worthless. But when once the succession of the rocks has been fixed palæontological evidence may become paramount.

## STRATIGRAPHICAL GEOLOGY.

This branch of the science arranges the rocks of the earth's crust in the order of their appearance, and interprets the sequence of events of which they form the records. Its province is to cull from all the other departments of geology the facts which may be needed to show what has been the progress of our planet, and of each continent and country, from the earliest times of which the rocks have preserved any memorial. Thus from mineralogy and petrography it obtains information regarding the origin and subsequent mutations of minerals and rocks. From dynamical geology it learns by what agencies the materials of the earth's crust have been formed, altered, broken, upheaved, and melted. From structural geology it understands how these materials were put together so as to build up the complicated crust of the earth. From palæontological geology it receives in well-determined fossil remains a clue by which to discriminate the different stratified formations, and to trace the grand onward march of organized existence upon this planet. Stratigraphical geology thus gathers up the sum of all that is made known by the other departments of the science, and makes it subservient to the interpretation of the geological history of the earth.

The leading principles of stratigraphy may be summed up as follows:

1. In every stratigraphical research the fundamental requisite is to establish the order of superposition of the strata. Until this is accomplished it is impossible to arrange the dates and make out the sequence of geological history.

2. The stratified portion of the earth's crust, or geological record, as it has been termed, may be subdivided into natural groups or formations of strata, each marked throughout by some common genera or species, or by a general resemblance in the type or character of its organic remains.

3. Many living species of plants and animals can be traced downward through the more recent geological formations; but they grow fewer in number as they are followed into more ancient deposits. With their disappearance we encounter other species and genera which are no longer living. These in turn may be traced backward into earlier formations, till they too cease, and their places are taken by yet older forms. It is thus shown that the stratified rocks contain the records of a gradual progression of organic forms. A species which has once died out does not seem ever to have reappeared. But as has been already pointed out in reference to Barrande's doctrine of colonies, a species may within a limited area appear in a formation older than that of which it is characteristic, having temporarily migrated into the district from some neighboring region where it had already established itself.

4. When the order of succession of organic remains among the stratified rocks has been determined, they become an invaluable guide in the investigation of the relative age of rocks and the structure of the land. Each zone and formation, being characterized by its own species or genera, may be recognized by their means,



and the true succession of strata may thus be confidently established even in a country which has been shattered by dislocation, or where the rocks have been folded and inverted.

5. The relative chronological value of the divisions of the geological record is not to be measured by mere depth of strata. While it may be reasonably assumed that a great thickness of stratified rock must mark the passage of a long period of time, it cannot safely be affirmed that a much less thickness elsewhere represents a correspondingly diminished period. This may sometimes be made evident by an unconformability between two sets of rocks, as has already been explained. The total depth of both groups together may be, say 1,000 feet. Elsewhere we may find a single unbroken formation reaching a depth of 10,000 feet; but it would be utterly erroneous to conclude that the latter represents ten times the length of time shown by the two former. So far from this being the case, it might not be difficult to show that the minor thickness of rock really denoted by far the longer geological interval. If, for instance, it could be proved that the upper part of both the sections lay on one and the same geological platform, but that the lower unconformable series in the one locality belonged to a far lower and older system of rocks than the base of the thick conformable series in the other, then it would be clear that the gap marked by the unconformability really indicated a longer period than the massive succession of deposits.

6. Fossil evidence furnishes the chief means of comparing the relative value of formations and groups of rock. A break in the succession of organic remains marks an interval of time often unrepresented by strata at the place where the break is found. The relative importance of these breaks, and therefore, probably, the comparative intervals of time which they mark, may be estimated by the difference of the facies of the fossils on each side. If, for example, in one case we find every species to be dissimilar above and below a certain horizon, while in another locality only half of the species on each side are peculiar, we naturally infer, if the total number of species seems large enough to warrant the inference, that the interval marked by the former break was very much longer than that marked by the second. But we may go further and compare by means of fossil evidence the relation between breaks in the succession of organic remains and the depth of strata between them.

Three formations of fossiliferous strata, A, C and H, may occur conformably above each other. By a comparison of the fossil contents of all parts of A, it may be ascertained that, while some species are peculiar to its lower, others to its higher portions, yet the majority extend throughout the formation. If now it is found that of the total number of species in the upper portion of A only one-third passes up into C, it may be inferred with some probability that the time represented by the break between A and C was really longer than that required for the accumulation of the whole of the formation A. It might even be possible to discover elsewhere a thick intermediate formation B filling up the gap between A and C. In like manner were it to be discovered that, while the whole of the formation C is characterized by a common suite of fossils, not one of the species and only one-half of the genera pass up into H, the inference could hardly be resisted that the gap between the two formations marks the passage of a far longer interval than was needed for the deposition of the whole of C. And thus we reach the remarkable conclusion that thick though the stratified formations of a country may be, in some cases they may not represent so long a total

period of time as do the gaps in their succession — In other words, that non-deposition was more frequent and prolonged than deposition, or that the intervals of time which have been recorded by strata have not been so long as those which have not been so recorded.

In all speculations of this nature, however, it is necessary to reason from as wide a basis of observation as possible, seeing that so much of the evidence is negative. Especially needful is it to bear in mind that the cessation of one or more species at a certain line among the rocks of a particular district may mean nothing more than that, owing to some change in the conditions of life or of deposition, these species were compelled to migrate or became locally extinct at the time marked by that line. They may have continued to flourish abundantly in neighboring districts for a long period afterward. Many examples of this obvious truth might be cited. Thus in a great succession of mingled marine, brackish-water, and terrestrial strata, like that of the Carboniferous Limestone series of Scotland, corals, crinoids, and brachiopods abound in the limestones and accompanying shales, but disappear as the sandstones, ironstones, clays, coals, and bituminous shales supervene. An observer meeting for the first time with an instance of the disappearance, and remembering what he had read about "breaks in succession," might be tempted to speculate about the extinction of these organisms, and their replacement by other and later forms of life, such as the ferns, lycopods, ganoid fishes, and other fossils so abundant in the overlying strata. But further research would show him that high above the plant-bearing sandstones and coals other limestones and shales might be observed, once more charged with the same marine fossils as before, and still farther overlying groups of sandstones, coals, and carbonaceous beds followed by yet higher marine limestones. He would thus learn that the same organisms, after being locally exterminated, returned again and again to the same area. After such a lesson he would probably pause before too confidently asserting that the highest bed in which we can detect certain fossils marked really their final appearance in the history of life. A break in the succession may thus be extremely local, one set of organisms having been driven to a different part of the same region, while another set occupied their place until the first was enabled to return.

7. The geological record is at the best but an imperfect chronicle of the geological history of the earth. It abounds in gaps, some of which have been caused by the destruction of strata owing to metamorphism, denudation, or otherwise, some by original non-deposition, as above explained. Nevertheless from this record alone can the progress of the earth be traced. It contains the registers of the births and deaths of tribes of plants and animals which have from time to time lived on the earth. But a small proportion of the total number of species which have appeared in past time have been thus chronicled, yet, by collecting the broken fragments of the record, an outline, at least, of the history of life upon the earth can be deciphered.

The geological record is classified into five main divisions: (1) the Archæan, Azoic (lifeless), or Eozoic (dawn of life) Periods; (2) the Primary or Palæozoic (ancient life) Periods; (3) the Secondary or Mesozoic (middle life) Periods; (4) the Tertiary or Cainozoic (recent life); and (5) the Quaternary or Post-Tertiary Periods. These divisions are further ranged into systems, each system into formations, each formation into groups, and each group or series into single zones or horizons. The subjoined generalized table exhibits the order in which the chief subdivisions appear:



*Order of Succession of the Stratified Formation of the Earth's Crust.*

|                              | BRITAIN.                                                                                                                                                                           | CONTINENTAL EUROPE.                                                                                                                                                                                                                                                                                             | NORTH AMERICA.                                                                                                                                                   |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Post-Tertiary or Quaternary. | Recent—Alluvium, peat, etc.<br>Pleistocene— <i>Cave deposits, Glacial drift.</i>                                                                                                   | Alluvium.<br>Diluvium.                                                                                                                                                                                                                                                                                          | Recent or Terrace.<br>Champlain.<br>Glacial.                                                                                                                     |
| Tertiary or Cainozoic.       | Pliocene — <i>Crag deposits of Norfolk and Suffolk.</i><br>Miocene— <i>Lignite of Bovey Tracey, Mull, etc.</i><br>Eocene — <i>Tertiaries of Hampshire Basin and Isle of Wight.</i> | Pliocene — <i>Tegel, Dinotherium-Sand.</i><br>Miocene— <i>Leithakalk, Upper Molasse.</i><br>Oligocene— <i>Lower Molasse, Gres de Fontainebleau, etc.</i><br>Eocene — <i>Nummulite-limestone, Flysch.</i>                                                                                                        | Sumter.<br>Yorktown.<br>Alabama.<br>Lignitic.                                                                                                                    |
| Secondary or Mesozoic.       | Cretaceous. { Upper.<br>Lower.<br>Jurassic. { Oolitic. { Upper.<br>{ Lower.<br>{ Liasic. {<br>Triassic { Upper.<br>{ Lower.                                                        | Senonian — <i>Craie blanche et tuffeau, Upper Quadersandstein.</i><br>Turonian — <i>Planerkalk.</i><br>Cenomanian — <i>Gres vert.</i><br>Gault.<br>Necomian.<br>Upper or White Jura (Malm).<br>Middle or Brown Jura (Dogger).<br>Lower or Black Jura (Lias).<br>Rhætic beds, Keuper.<br>Muschelkalk.<br>Bunter. | Fox-Hills group.<br>Pierre group<br>Niobrara group.<br>Benton gr'p<br>Dakota g'p<br>Jurassic rocks appear to be but poorly developed in N. America.<br>Triassic. |
| Primary or Palæozoic.        | Permian.<br>Carboniferous. { Coal-measures<br>{ Millstone Grit<br>{ Carboniferous Limestone.<br>Devonian and Old Red Sandstone.<br>Silurian.<br>Cambrian.                          | Dyas or { <i>Zechstein, Rothliegendes.</i><br>Permian {<br>Terrain houiller, Steinkohlen.<br>Flotzleerer Sandstein.<br>Calcaire Carbonifere, Kohlenkalk, Kulm.<br>Devonian.<br>Silurian (Transition or Grauwacke system).<br>Primordial Silurian, older grauwacke and slate.<br>Primitive schists.              | Permian.<br>Carboniferous.<br>Sub-Carboniferous.<br>Devonian.<br>Silurian.<br>Primordial Silurian and Cambrian.<br>Huronian.                                     |
| Archaean or Azoic (Eozoic).  | Fundamental gneiss.                                                                                                                                                                | Ur-gneiss.                                                                                                                                                                                                                                                                                                      | Laurentian.                                                                                                                                                      |

The nomenclature adopted for the subdivisions of the geological record bears witness to the rapid growth of geology. It is a patch-work in which no system nor language has been adhered to, but where the influences by which the progress of the science has been molded may be distinctly traced. Some of the earliest names are lithological, and remind us of the fact that mineralogy and petrography preceded geology in the order of birth—Chalk, Oölite, Greensand, Millstone Grit. Others are topographical, and often recall the labors of the early geologists of England—London Clay, Oxford Clay, Purbeck, Portland, Kimeridge beds. Others are taken from local English provincial names, and remind us of the debt we owe to William Smith, by whom so many of them were first used—Lias, Gault, Crag, Cornbrash. Others of later date recognize an order of superposition as already established among formations—Old Red Sandstone, New Red Sandstone. By common consent it is admitted that names taken from the region where a formation or group of rocks is typically developed are best adapted for general use. Cambrian, Silurian, Devonian, Permian, Jurassic, are of this class, and have been adopted all over the globe.

But whatever be the name chosen to designate a particular group of strata, it soon comes to be used as a chronological or homotaxial term, apart altogether from the stratigraphical character of the strata to which it is applied. Thus we speak of the Chalk or Cretaceous system, and embrace under that term formations which may contain no chalk; and we may describe as Silurian a series of strata utterly unlike in lithological characters to the formations in the typical Silurian country. In using these terms we unconsciously allow the idea of relative date to arise prominently before us. Hence such a word as chalk or cretaceous does not suggest so much to us the group of strata so called, as the interval of geological history which these strata represent. We speak of the Cretaceous, Jurassic and Cambrian periods, and of the Cretaceous fauna, the Jurassic flora, the Cambrian trilobites, as if these adjectives denoted simply epochs of geological time.

#### PHYSIOGRAPHICAL GEOLOGY.

In the investigation of the geological history of any country, two questions present themselves. We have first to consider the nature and arrangement of the rocks which underlie the surface, and to ascertain from them what has been the march of events, what changes in geography have successively taken place, and what races of plants and animals have come and gone. The gradual geological evolution of the earth has been sketched in the foregoing part of this article. But besides the history of the solid rocks beneath the surface of the land, there is that of the surface itself. Mountains and plains, valleys and ravines, cliffs, peaks, passes, lakes, and the many other features of a country demand attention. By what processes have these varied outlines been impressed upon the surface of the globe? Are they of different ages, and if so, how can their history be ascertained?

The branch of geological inquiry which endeavors to answer these questions has been termed Physiography or Physiographical Geology. Its investigations evidently demand an acquaintance with Stratigraphical Geology. We must be able to trace out the former geographical conditions of the globe before we can adequately reason on the origin of those now existing. Hence the consideration of this branch of the subject has necessarily been reserved for this concluding section.

The stratified formations, of which the succession and history have been traced in the previous pages.



were chiefly laid down on the sea-floor in wide horizontal or gently inclined sheets. They have since been upraised into land; their horizontality has been in great part destroyed; and they have been enormously wasted by denuding agents. In considering, therefore, how they have acquired their present external forms, we have to deal with the effects of two kinds of forces, one acting from below, the other on the surface.

These stratified rocks were, on the whole, deposited in shallow water, and have been repeatedly upraised and denuded, so that the younger have been formed out of the waste of the older. They have their modern counterparts, not in the deposits of the great ocean-basins, but in those of comparatively shallow seas. The inference to be drawn from these facts is that the present continental regions, through many local oscillations, have existed as terrestrial ridges from a remote geological antiquity, and that the ocean basins in like manner have, on the whole, retained their identity. When the geologist asks himself how the present distribution of sea and land is to be accounted for, he finds that the answer to the question goes back to early Palæozoic times, whence he can in some cases trace the gradual growth of a continent downward through the long cycles of geological time. But there still remains the problem to account for the original wrinkling of the surface of the globe, whereby the present great ridges and hollows were produced.

It is now generally agreed that these inequalities have been produced by unequal contraction of the earth's mass, the interior contracting more than the outer crust, which must therefore have accommodated itself to this diminution of diameter by undergoing corrugation. But there seems to have been some original distribution of materials in the globe that initiated the depressions on the areas which they have retained.

The geological phenomena long ago led to a belief in the liquidity of the earth's interior. Since this belief has been so weightily opposed by the physical arguments already adduced, geologists have endeavored to modify it in such a way as, if possible, to satisfy the requirements of physics, while at the same time providing an adequate explanation of the corrugation of the earth's crust. Mr. Hopkins, Professor Dana, Professor Shaler, and Mr. Fisher have, on different grounds, advocated the existence of a fluid or viscous substratum beneath the crust, the contraction and consolidation of which produce the corrugations of the rocks and of the surface. "The increase of temperature," says Mr. Fisher, "though rapid near the surface, becomes less and less as we descend, so that, if the earth were once wholly melted, the temperature near the center is not very greatly above what it is at a depth which, compared to the earth's radius, is small. Consequently, if it requires great pressure to solidify the materials at such a temperature, it is probable that the melting temperature may be reached before the pressure is sufficient to solidify." The crust, of course, must be able to sustain itself on the corrugated surface of the supposed viscous layer without breaking up and sinking. The same writer has even suggested that the observed amount of corrugation is more than can be accounted for even on this hypothesis, and that the shrinkage may have been due not merely to cooling, but to the escape of water from the interior in the form of the superheated steam of volcanic vents.

Leaving the vexed question of the condition of the earth's interior, the hypothesis of secular cooling and contraction furnishes a natural explanation of the origin of the dominant elevations and depressions of the surface, and of the intense crumpling which the rocks in many regions have undergone. Taking 0.09 as the

coefficient of contraction for a supposed stratum five hundred miles thick, lying beneath twenty-five miles of crust, and passing from a fused into a solid state, Mr. Fisher found that every one hundred miles measured along a great circle on the surface would have been one mile larger before the contraction, and that this might produce a triangular elevation of "twenty-five square miles on a base of one hundred miles, which would give a range of mountains half a mile high. If only fifty miles out of the hundred were disturbed, the range would be a mile high, and so on."

The effects of this lateral pressure may show themselves either in broad dome-like elevations, or in narrower and loftier ridges of mountain. The structure of the crust is so complex, and the resistance offered by it to the pressure is consequently so varied, that abundant cause is furnished for almost any diversity in the forms and distribution of the wrinkles into which it is thrown. It is evident, however, that the folds have tended to follow a linear direction. In North America, from early geological times, they have kept on the whole on the lines of meridians. In the Old World, on the contrary, they have chosen diverse trends, but the last great crumplings—those of the Alps, Caucasus, and the great mountain ranges of central Asia—have risen along parallels of latitude.

Mountain chains must therefore be regarded as evidence of the shrinkage of the earth's mass. They may be the result of one movement, or of a long succession of such movements. Formed on lines of weakness in the crust, they have frequently given relief from the strain of compression by undergoing fresh crumpling and upheaval. The successive stages of uplift are usually not difficult to trace.

In the physiography of any region, the mountains are the dominant features. A true mountain chain consists of rocks which have been crumpled and pushed up in the manner already described. But ranges of hills almost mountainous in their bulk may be formed by the gradual erosion of valleys out of a mass of original high ground. In this way some ancient tablelands, those of Norway and of the Highlands of Scotland, for example, have been so channeled by deep fjords and glens that they now consist of massive rugged hills, either isolated or connected along the flanks. The forms of the valleys thus eroded have been governed partly by the structure and composition of the rocks, and partly by the relative potency of the different denuding agents. Where the influence of rain and frost has been slight, and the streams, supplied from distant sources, have had sufficient declivity, deep, narrow, precipitous ravines or gorges have been excavated. The cañons of the Colorado are a magnificent example of this result. Where, on the other hand, ordinary atmospheric action has been more rapid, the sides of the river channels have been attacked, and open sloping glens and valleys have been hollowed out. A gorge or defile is usually due to the action of a waterfall, which, beginning with some abrupt declivity or precipice in the course of the river when it first commenced to flow, or caused by some hard rock crossing the channel, has eaten its way backward.

Lakes may have been formed in several ways. 1. By subterranean movements as, for example, during those which gave rise to mountain chains. But these hollows, unless continually deepened by subsequent movements of a similar nature, would be filled up by the sediment continually washed into them from the adjoining slopes. The numerous lakes in such a mountain system as the Alps cannot be due merely to this cause, unless we suppose the upheaval of the mountains to have been geologically quite recent, or that subsidence must take place continuously or periodically below each



independent basin. But there is evidence that the upheaval of the lakes is not of recent date, while the idea of perpetuating lakes by continual subsidence would demand, not in the Alps merely, but all over the northern hemisphere where lakes are so abundant, an amount of subterranean movement of which, if it really existed, there would assuredly be plenty of other evidence. 2. By irregularities in the deposition of superficial accumulations prior to the elevation of the land or during the disappearance of the ice-sheet. The numerous tarns and lakes inclosed within mounds and ridges of drift-clay and gravel are examples. 3. By the accumulation of a barrier across the channel of a stream and the consequent ponding back of the water. This may be done, for instance, by a landslip, by the advance of a glacier across a valley, or by the throwing up of a bank by the sea across the mouth of a river. 4. By erosion. The only agent capable of excavating hollows out of the solid rock such as might form lake-basins is glacier-ice. It is a remarkable fact, of which the significance may now be seen, that the innumerable lake-basins of the northern hemisphere lie on surfaces of intensely ice-worn rock. The striæ can be seen on the smoother rock-surfaces slipping into the water on all sides. These striæ were produced by ice moving over the rock. If the ice could, as the striæ prove, descend into the rock-basins and mount up the farther side, smoothing and striating the rock as it went, it could erode the basins. It is hardly possible to convey in words an adequate conception of the enormous extent to which the north of Europe and North America has had its surface ground down by ice. The ordinary rough surfaces produced by atmospheric disintegration have been replaced by a peculiar flowing contour which is traceable even to below the sea-level.

Tablelands may sometimes arise from the abrasion of hard rocks and the production of a level plain by the action of the sea, or rather of that action combined with the previous degradation of the land by subaërial waste. But most of the great tablelands of the globe seem to be platforms of little-disturbed strata which have been upraised bodily to a considerable elevation.

GEOMETRICAL MEAN of two numbers is that number the square of which is equal to the product of the two numbers; thus, the geometrical mean of 9 and 16 is 12, for  $9 \times 16 = 144 = 12^2$ ; hence the geometrical mean of two numbers is found by multiplying the two numbers together, and extracting the square root of the product.

GEOMETRICAL PROGRESSION. A series of quantities are said to be in geometrical progression when each term of the series is equal to that which precedes it multiplied by some constant factor—*i. e.*, some factor which is the same for all the terms; or, in other words, when the ratio of any two successive terms is the same.

GEOMETRY [from  $\gamma\eta$  (gē), the earth, and  $\mu\epsilon\tau\rho\omicron\nu$  (metron), measure] has been divided since the time of Euclid into an "elementary" and a "higher" part. The contents and limits of the former have been fixed by Euclid's *Elements*. The latter included at the time of the Greek mathematicians principally the properties of the conic sections and of a few other curves. The methods used in both were essentially the same. These began to be replaced during the seventeenth century by more powerful methods, invented by Roberval, Pascal, Desargues, and others. But the impetus which higher geometry received in their works was soon arrested, in consequence of the discoveries of Descartes—the new calculus to which these gave rise absorbing the attention of mathematicians almost exclusively, until Monge, at the end of the eighteenth century, reestablished

"pure" as distinguished from Descartes' "coördinate" (or analytical) geometry. Since then the purely geometrical methods have been continuously extended, especially by Poncelet, Steiner, Von Staudt, and Cremona, and in England by Hirst and Henry Smith, to mention only a few of the leading names.

While higher geometry thus made most rapid progress, the elementary part remained almost unaltered. It has been taught up to the present day on the basis of Euclid's *Elements*, the latter being either used directly as a text-book (in England), or being replaced (in most parts of the continent) by text-books which are essentially Euclid's *Elements* rewritten, with a few additions about the mensuration of the circle, cone, cylinder, and sphere. Only within a very recent period have attempts been made to change the character of the elementary part by introducing some of the modern methods.

The object of geometry is to investigate the properties of space. The first step must consist in establishing those fundamental properties from which all others follow by processes of deductive reasoning. They are laid down in the Axioms, and these ought to form such a system that nothing need be added to them in order fully to characterize space, and that nothing may be left out without making the system incomplete. They must, in fact, completely "define" space. Several such systems are conceivable. Euclid has given one, others have been put forward in recent times by Riemann, by Helmholtz and by Grassmann. How many axioms the system ought to contain, and which system is the simplest, may be said to be still an open question. We shall consider only Euclid's system.

The axioms are obtained from inspection of space and of solids in space—hence from experience. The same source gives us the notions of the geometrical entities to which the axioms relate, *viz.*, solids, surfaces, lines or curves, and points. A solid is directly given by experience; we have only to abstract all material from it in order to gain the notion of a geometrical solid. This has shape, size, position, and may be moved. Its boundary or boundaries are called surfaces. They separate one part of space from another, and are said to have no thickness. Their boundaries are curves or lines, and these have length only. Their boundaries, again, are points, which have no magnitude, but only position. We thus come in three steps from solids to points which have no magnitude; in each step we lose one extension. Hence we say a solid has three dimensions, a surface two, a line one, and a point none. Space itself, of which a solid forms only a part, is also said to be of three dimensions. The same thing is intended to be expressed by saying that a solid has length, breadth and thickness, a surface length and breadth, a line length only, and a point no extension whatsoever.

Euclid gives the essence of these statements as definitions:

Def. 1, I. *A point is that which has no parts, or which has no magnitude.*

Def. 2, I. *A line is length without breadth.*

Def. 5, I. *A superficies is that which has only length and breadth.*

Def. 1, XI. *A solid is that which has length, breadth and thickness.*

If we allow motion in geometry, and it seems impossible to avoid it, we may generate these entities by moving a point, a line, or a surface, thus:

The path of a moving point is a line.

The path of a moving line is, in general, a surface.

The path of a moving surface is, in general, a solid.

And we may then assume that the lines, surfaces, and solids, as defined before, can all be generated in this manner. From this generation of the entities it follows



again that the boundaries — the first and last position of the moving element — of a line are points, and so on; and thus we come back to the considerations with which we started.

Euclid's definitions mentioned above are attempts to describe, in a few words, notions which we have obtained by inspection of and abstraction from solids. A few more notions have to be added to these, principally those of the simplest line — the straight line, and of the simplest surface — the flat surface or plane. These notions we possess, but to define them accurately is difficult. Euclid's Definition, "A straight line is that which lies evenly between its extreme points," must be meaningless to any one who has not the notion of straightness in his mind. Neither does it state a property of the straight line which can be used in any further investigation. Such a property is given in Axiom 10, I. It is really this axiom, together with Postulates 2 and 3, which characterizes the straight line.

While for the straight line the verbal definition and axiom are kept apart, Euclid mixes them up in the case of the plane. Here the Definition 7, I., includes an axiom. It defines a plane as a surface which has the property that every straight line which joins any two points in it lies altogether in the surface. But if we take a straight line and a point in such a surface, and draw all straight lines which join the latter to all points in the first line, the surface will be fully determined. This construction is therefore sufficient as a definition. That every other straight line which joins any two points in this surface lies altogether in it is a further property, and to assume it gives another axiom.

Thus a number of Euclid's axioms are hidden among his first definitions. A still greater confusion exists in the present editions of Euclid between the postulates and axioms so-called, but this is due to later editors and not to Euclid himself. The latter had the last three axioms put together with the postulates, so that these were meant to include all assumptions relating to space. The remaining assumptions which relate to magnitudes in general, viz., the first eight "axioms" in modern editions, were called "common notions." Of the latter a few may be said to be definitions. Thus the eighth might be taken as a definition of "equal," and the seventh of halves. If we wish to collect the axioms used in Euclid's *Elements*, we have therefore to take the three postulates, the last three axioms as generally given, a few axioms hidden in the definitions, and an axiom used by Euclid in the proof of Prop. 4 and on a few other occasions, viz., that figures may be moved in space without change of shape or size.

We shall not enter into the investigation how far the assumptions which would be included in such a list are sufficient, and how far they are necessary. It may be sufficient here to state that from the beginning of a geometrical science to the present century attempts without end have been made to prove the last of Euclid's axioms, that only at the beginning of the present century the futility of this attempt was shown, and that only within the last twenty years the true nature of the connection between the axioms has become known through the researches of Riemann and Helmholtz, although Grassmann had published already, in 1844, his classical but long-neglected *Ausdehnungslehre*.

The assumptions actually made by Euclid may be stated as follows:—

1. Straight lines exist which have the property that any one of them may be produced both ways without limit, that through any two points in space such a line can be drawn, and that any two of them coincide throughout their indefinite extensions as soon as two points in the one coincide with two points in the other.

2. Plane surfaces or planes exist having the property laid down in Def. 7, that every straight line joining any two points in such a surface lies altogether in it.

3. Right angles, as defined in Def. 10, are possible, and all right angles are equal; that is to say, wherever in space we take a plane, and wherever in that plane we construct a right angle, all angles thus constructed will be equal, so that any one of them may be made to coincide with any other.

4. Figures may be freely moved in space without change of shape or size. This is assumed by Euclid, but not stated as an axiom.

5. In any plane a circle may be described, having any point in that plane as center, and its distance from any other point in that plane as radius.

The definitions which have not been mentioned are all "nominal definitions," that is to say, they fix a name for a thing described. Many of them overdetermine a figure.

Euclid's *Elements* are contained in thirteen books. Of these the first four and the sixth are devoted to "plane geometry," as the investigation of figures in a plane is generally called. The fifth book contains the theory of proportion which is used in Book VI. The seventh, eighth, and ninth books are purely arithmetical, while the tenth contains a most ingenious treatment of geometrical irrational quantities. The remaining three books relate to figures in space, or, as it is generally called, to "solid geometry." The seventh, eighth, ninth, tenth, thirteenth, and part of the eleventh and twelfth books are now generally omitted from the school editions of the *Elements*. In the first four and in the sixth book it is to be understood that all figures are drawn in a plane.

GEORGE I., king of Great Britain and Ireland, born in 1660, was heir through his father Ernest Augustus to the hereditary lay bishopric of Osnabrück, and to the duchy of Calenburg, which formed one portion of the Hanoverian possessions of the house of Brunswick, while he secured the reversion of the other portion, the duchy of Celle or Zell, by his marriage (1682) with the heiress, his cousin Sophia Dorothea. The marriage was not a happy one. The morals of German courts in the end of the seventeenth century took their tone from the splendid profligacy of Versailles. It became the fashion for a prince to amuse himself with a mistress or more frequently with many mistresses simultaneously, and he was often content that the mistresses whom he favored should be neither beautiful nor witty. George Louis followed the usual course. Count Königsmark — a handsome adventurer — seized the opportunity of paying court to the deserted wife. Conjugal infidelity was held at Hanover to be a privilege of the male sex. Count Königsmark was assassinated. Sophia Dorothea was divorced in 1694, and remained in seclusion till her death in 1726. When her descendant in the fourth generation attempted in England to call his wife to account for sins of which he was himself notoriously guilty, free-spoken public opinion reprobated the offense in no measured terms. In the Germany of the seventeenth century all free-spoken public opinion had been crushed out by the misery of the Thirty Years' War, and it was understood that princes were to arrange their domestic life according to their own pleasure.

The prince's father did much to raise the dignity of his family. By sending help to the emperor when he was struggling against the French and the Turks, he obtained the grant of a ninth electorate in 1692. His marriage with Sophia, the youngest daughter of Elizabeth the daughter of James I. of England, was not one which at first seemed likely to confer any prospect of advancement to his family. But though there were



many persons whose birth gave them better claims than she had to the English crown, she found herself, upon the death of the duke of Gloucester, the next Protestant heir after Anne. The Act of Settlement in 1701 secured the inheritance to herself and her descendants. Being old and unambitious she rather permitted herself to be burthened with the honor than thrust herself forward to meet it. Her son George took a deeper interest in the matter. In his youth he had fought with determined courage in the wars of William III. Succeeding to the electorate on his father's death in 1698, he had sent a welcome reënforcement of Hanoverians to fight under Marlborough at Blenheim. With prudent persistence he attached himself closely to the Whigs and to Marlborough, refusing Tory offers of an independent command, and receiving in return for his fidelity a guarantee by the Dutch of his succession to England in the Barrier treaty of 1709. In 1714 when Anne was growing old, and Bolingbroke and the more reckless Tories were coquetting with the son of James II., the Whigs invited George's eldest son, who was duke of Cambridge, to visit England in order to be on the spot in case of need. Neither the elector nor his mother approved of a step which was likely to alienate the queen, and which was specially distasteful to himself, as he was on very bad terms with his son. Yet they did not set themselves against the strong wish of the party to which they looked for support, and it is possible that troubles would have arisen from any attempt to carry out the plan, if the deaths, first of the electress (May 28) and then of the queen (August 1, 1714), had not laid open George's way to the succession without further effort of his own.

In some respects the position of the new king was not unlike that of William III. a quarter of a century before. Both sovereigns were foreigners, with little knowledge of English politics and little interest in English legislation. Both sovereigns arrived at a time when party spirit had been running high, and when the task before the ruler was to still the waves of contention. In spite of the difference between an intellectually great man and an intellectually small one, in spite too of the difference between the king who began by choosing his ministers from both parties, and the king who persisted in choosing his ministers from only one, the work of pacification was accomplished by George even more thoroughly than by William.

George I. was fortunate in arriving in England when a great military struggle had come to an end. He had therefore no reason to call upon the nation to make great sacrifices. All that he wanted was to secure for himself and his family a high position which he hardly knew how to occupy, to fill the pockets of his German attendants and his German mistresses, to get away as often as possible from the uncongenial islanders whose language he was unable to speak, and to use the strength of England to obtain petty advantages for his German principality. In order to do this he attached himself entirely to the Whig party, though he refused to place himself at the disposal of its leaders. He gave his confidence, not to Somers and Wharton and Marlborough, but to Stanhope and Townshend, the statesmen of the second rank. At first he seemed to be playing a dangerous game. The Tories, whom he rejected, were numerically superior to their adversaries, and were strong in the support of the country gentlemen and the country clergy. The strength of the Whigs lay in the towns and in the higher aristocracy. Below both parties lay the mass of the nation, which cared nothing for politics except in special seasons of excitement, and which asked only to be let alone. In 1715, a Jacobite insurrection in the north, supported by the appearance of the

Pretender, the son of James II., in Scotland, was suppressed, and its suppression not only gave to the government a character of stability, but displayed its adversaries in an unfavorable light as the disturbers of the peace.

A fortunate concurrence of circumstances enabled George's ministers, by an alliance with the regent of France, the duke of Orleans, to pursue at the same time the Whig policy of separating France from Spain and from the cause of the Pretender, and the Tory policy of the maintenance of a good understanding with their neighbor across the Channel. The same eclecticism was discernible in the proceedings of the home government. The Whigs were conciliated by the repeal of the Schism Act and the Occasional Conformity Act, while the Tories were conciliated by the maintenance of the Test Act in all its vigor. The satisfaction of the masses was increased by the general wellbeing of the nation.

Very little of all that was thus accomplished was directly owing to George I. The policy of the reign is the policy of his ministers. Stanhope and Townshend from 1714 to 1717 were mainly occupied with the defense of the Hanoverian settlement.

Nevertheless something of the honor due to Walpole must be reckoned to the king's credit. It is evident that at his accession his decisions were by no means unimportant. The royal authority was still able within certain limits to make its own terms. This support was so necessary to the Whigs that they made no resistance when he threw aside their leaders on his arrival in England. When by his personal intervention he dismissed Townshend and appointed Sunderland, he had no such social and parliamentary combination to fear as that which almost mastered his great-grandson in his struggle for power. If such a combination arose before the end of his reign it was owing more to his omitting to fulfil the duties of his station than from the necessity of the case. As he could talk no English, and his ministers could talk no German, he absented himself from the meetings of the cabinet, and his frequent absences from England and his want of interest in English politics strengthened the cabinet in its tendency to assert an independent position. Walpole at last by his skill in the management of parliament rose as a subject into the almost royal position denoted by the name of prime minister. In connection with Walpole the force of wealth and station established the Whig aristocracy in a point of vantage from which it was afterward difficult to dislodge them. Yet, though George had allowed the power which had been exercised by William and Anne to slip through his hands, it was understood to the last that if he chose to exert himself he might cease to be a mere cipher in the conduct of affairs. As late as in 1727 Bolingbroke gained over one of the king's mistresses, the duchess of Kendal; and though her support of the fallen Jacobite took no effect, Walpole was not without fear that her reiterated entreaties would lead to his dismissal. The king's death in a carriage on his way to Hanover, in the night between June 10th and 11th, in the same year, put an end to these apprehensions.

His only children were his successor George II., and Sophia Dorothea (1687-1757), who married in 1706 Frederick William, crown prince (afterward king) of Prussia. She was the mother of Frederick the Great.

GEORGE II. (*George Augustus*), the only son of George I., was born in 1683. In 1705 he married Wilhelmina Caroline of Anspach. In 1706 he was created earl of Cambridge. In 1708 he fought bravely at Oudenarde. At his father's accession to the English throne he was thirty-one years of age. He



was already on bad terms with his father. The position of an heir-apparent is in no case an easy one to fill with dignity, and the ill treatment of the prince's mother by his father was not likely to strengthen in him a reverence for paternal authority.

When George I. died in 1727, it was generally supposed that Walpole would be at once dismissed. The first direction of the new king was that Sir Spencer Compton would draw up the speech in which he was to announce to the privy council his accession. Compton, not knowing how to set about his task, applied to Walpole for aid. The queen took advantage of this evidence of incapacity, advocated Walpole's cause with her husband, and procured his continuance in office. This curious scene was indicative of the course likely to be taken by the new sovereign. His own mind was incapable of rising above the merest details of business. He made war in the spirit of a drill-sergeant, and he economized his income with the minute regularity of a clerk. A blunder of a master of the ceremonies in marshaling the attendants on a levee put him out of temper. He took the greatest pleasure in counting his money piece by piece, and he never forgot a date. He was above all things methodical and regular.

Though in his domestic relations he was as loose a liver as his father had been, he allowed himself to be guided by the wise but unobtrusive counsels of his wife until her death in 1737, and when once he had recognized Walpole's superiority he allowed himself to be guided by the political sagacity of the great minister. It is difficult to exaggerate the importance of such a temper upon the development of the constitution. The apathy of the nation in all but the most exciting political questions, fostered by the calculated conservatism of Walpole, had thrown power into the hands of the great land-owners. They maintained their authority by supporting a minister who was ready to make use of corruption, wherever corruption was likely to be useful, and who could veil over the baseness of the means which he employed by his talents in debate and finance. To shake off a combination so strong would not have been easy. George II. submitted to it without a struggle.

The years which followed settled conclusively, at least for this reign, the constitutional question of the power of appointing ministers. The war between Spain and England had broken out in 1739. In 1741 the death of the emperor Charles VI. brought on the war of the Austrian succession. The position of George II. as a Hanoverian prince drew him to the side of Maria Theresa through jealousy of the rising Prussian monarchy. Jealousy of France led England in the same direction, and in 1741 a subsidy of £300,000 was voted to Maria Theresa. The king himself went to Germany and attempted to carry on the war according to his own notions. Those notions led him to regard the safety of Hanover as of far more importance than the wishes of England. Finding that a French army was about to march upon his German states, he concluded with France a treaty of neutrality for a year without consulting a single English minister. In England the news was received with feelings of disgust. The expenditure of English money and troops was to be thrown uselessly away as soon as it appeared that Hanover was in the slightest danger. In 1742 Walpole was no longer in office. Lord Wilmington, the nominal head of the ministry, was a mere cipher. The ablest and most energetic of his colleagues, Lord Carteret, attached himself specially to the king, and sought to maintain himself in power by his special favor and by brilliant achievements in diplomacy.

In part at least by Carteret's mediation the peace of

Breslau was signed, by which Maria Theresa ceded Silesia to Frederick (July 28, 1742). Thus relieved on her northern frontier, she struck out vigorously toward the west. Bavaria was overrun by her troops. In the beginning of 1743 one French army was driven across the Rhine. On June 27th another French army was defeated by George II. in person at Dettingen. Victory brought elation to Maria Theresa. Her war of defense was turned into a war of vengeance. Bavaria was to be annexed. The French frontier was to be driven back. George II. and Carteret after some hesitation placed themselves on her side. Of the public opinion of the political classes in England they took no thought. Hanoverian troops were indeed to be employed in the war, but they were to be taken into British pay. Collisions between British and Hanoverian officers were frequent. A storm arose against the preference shown to Hanoverian interests. After a brief struggle Carteret, having become Lord Granville by his mother's death, was driven from office in November, 1744.

Henry Pelham, who had become prime minister in the preceding year, thus saw himself established in power. By the acceptance of this ministry, the king acknowledged that the function of choosing a ministry and directing a policy had passed from his hands. In 1745 indeed he recalled Granville, but a few days were sufficient to convince him of the futility of his attempt, and the effort to exclude Pitt at a later time proved equally fruitless.

Important as were the events of the remainder of the reign, therefore, they can hardly be grouped round the name of George II. The resistance to the invasion of the young Pretender in 1745, the peace of Aix-la-Chapelle in 1748, the great war ministry of Pitt at the close of the reign, did not receive their impulse from him. He had indeed done his best to exclude Pitt from office. He disliked him on account of his opposition in former years to the sacrifices demanded by the Hanoverian connection. When in 1756 Pitt became secretary of state in the Devonshire administration, the king bore the yoke with difficulty. Early in the next year he complained of Pitt's long speeches as being above his comprehension, and on April 5, 1757, he dismissed him, only to take him back shortly after, when Pitt, coalescing with Newcastle, became master of the situation. Before Pitt's dismissal George II. had for once an opportunity of placing himself on the popular side, though, as was the case of his grandson during the American war, it was when the popular side happened to be in the wrong. In the true spirit of a martinet, he wished to see Admiral Byng executed. Pitt urged the wish of the House of Commons to have him pardoned. "Sir," replied the king, "you have taught me to look for the sense of my subjects in another place than in the House of Commons." When George II. died, in 1760, he left behind him a settled understanding that the monarchy was one of the least of the forces by which the policy of the country was directed. To this end he had contributed much by his disregard of English opinion in 1743; but it may fairly be added that, but for his readiness to give way to irresistible adversaries, the struggle might have been far more bitter and severe than it was.

Of the connection between Hanover and England in this reign two memorials remain more pleasant to contemplate than the records of parliamentary and ministerial intrigues. With the support of George II., amidst the derision of the English fashionable world, the Hanoverian Handel produced in England those masterpieces which have given delight to millions, while the foundation of the university of Göttingen by the same king opened a door through which English



political ideas afterward penetrated into Germany. George II. had three sons and five daughters.

GEORGE III. (*George William Frederick*), born June 4, 1738, was the son of Frederick prince of Wales and the grandson of George II., whom he succeeded in 1760. After his father's death in 1751 he had been educated in seclusion from the fashionable world under the care of his mother, and of her favorite counselor the earl of Bute. He had been taught to revere the maxims of Bolingbroke's *Patriot King*, and to believe that it was his appointed task in life to break the power of the Whig houses resting upon extensive property and the influence of patronage and corruption.

That power had already been gravely shaken. The Whigs from their incompetency were obliged when the Seven Years' War broke out to leave its management in the hands of William Pitt. The nation learned to applaud the great war minister who succeeded where others had failed, and whose immaculate purity put to shame the ruck of barterers of votes for places and pensions. In some sort the work of the new king was the continuation of the work of Pitt. But his methods were very different. He did not appeal to any widely spread feeling or prejudice; nor did he disdain the use of the arts which had maintained his opponents in power. As the first English-born sovereign of his house, speaking from his birth the language of his subjects, he found a way to the hearts of many who never regarded his predecessors as other than foreign intruders. The contrast, too, between the pure domestic life which he led with his wife Charlotte of Mecklenburg-Strelitz, whom he married in 1761, and the habits of three generations of his house, told in his favor with the vast majority of his subjects.

At first everything seemed easy to him. Pitt had come to be regarded by his own colleagues as a minister who would pursue war at any price, and in getting rid of Pitt in 1761 and in carrying on the negotiations which led to the peace of Paris in 1762, the king was able to gather round him many persons who would not be willing to acquiesce in any permanent change in the system of government. With the signature of the peace his real difficulties began. The Whig houses, indeed, were divided among themselves by personal rivalries. But they were none of them inclined to let power and the advantages of power slip from their hands without a struggle. For some years a contest of influence was carried on without dignity and without any worthy aim. The king was not strong enough to impose upon parliament a ministry of his own choice. But he gathered round himself a body of dependants known as the king's friends, who were secure of his favor, and who voted one way or the other according to his wishes. Under these circumstances no ministry could possibly be stable; and yet every ministry was strong enough to impose some conditions on the king. Lord Bute, the king's first choice, resigned from a sense of his own incompetency in 1763. George Grenville was in office till 1765; the marquis of Rockingham till 1766; Pitt, becoming earl of Chatham, till illness compelled him to retire from the conduct of affairs in 1767, when he was succeeded by the duke of Grafton. But a struggle of interests could gain no real strength for any government, and the only chance the king had of effecting a permanent change in the balance of power lay in the possibility of his associating himself with some phase of strong national feeling, as Pitt had associated himself with the war feeling caused by the dissatisfaction spread by the weakness and inaptitude of his predecessors.

Such a chance was offered by the question of the right to tax America. The notion that England was justified

in throwing on America part of the expenses caused in the late war was popular in the country, and no one adopted it more pertinaciously than George III. At the bottom the position which he assumed was as contrary to the principles of parliamentary government as the encroachments of Charles I. had been. There were thousands of people in England to whom it never occurred that there was any good reason why a British parliament should be allowed to levy a duty on tea in the London docks and should not be allowed to levy a duty on tea at the wharves of Boston. Undoubtedly George III. derived great strength from his honest participation in this mistake. Contending under parliamentary forms, he did not wound the susceptibilities of members of parliament, and when at last in 1770 he appointed Lord North — a minister of his own selection — prime minister, the object of his ambition was achieved with the concurrence of a large body of politicians who had nothing in common with the servile band of the king's friends.

As long as the struggle with America was carried on with any hope of success they gained that kind of support which is always forthcoming to a government which shares in the errors and prejudices of its subjects. The expulsion of Wilkes from the House of Commons in 1769, and the refusal of the House to accept him as a member after his reelection, raised a grave constitutional question in which the king was wholly in the wrong; and Wilkes was popular in London and Middlesex. But his case roused no national indignation, and when in 1774 those sharp measures were taken in Boston which led to the commencement of the American rebellion in 1775, the opposition to the course taken by the king made little way either in parliament or in the country. Burke might point out the folly and inexpediency of the proceedings of the government. Chatham might point out that the true spirit of English government was to be representative, and that that spirit was being violated at home and abroad. George III., who thought that the first duty of the Americans was to obey himself, had on his side the mass of unreflecting Englishmen who thought that the first duty of all colonists was to be useful and submissive to the mother country. The natural dislike of every country engaged in war to see itself defeated was on his side, and when the news of Burgoyne's surrender at Saratoga arrived in 1777, subscriptions of money to raise new regiments poured freely in.

In March, 1778, the French ambassador in London announced that a treaty of friendship and commerce had been concluded between France and the new United States of America. Lord North was anxious to resign power into stronger hands, and begged the king to receive Chatham as his prime minister. The king would not hear of it. He would have nothing to say to "that perfidious man" unless he would humble himself to enter the ministry as North's subordinate. Chatham naturally refused to do anything of the kind, and his death in the course of the year relieved the king of the danger of being again overruled by too overbearing a minister. England was now at war with France, and in 1779 she was also at war with Spain.

George III. was still able to control the disposition of office. He could not control the course of events. His very ministers gave up the war with America as hopeless long before he would acknowledge the true state of the case. Before the end of 1779, two of the leading members of the cabinet, Lords Gower and Weymouth, resigned rather than bear the responsibility of so ruinous an enterprise as the attempt to overpower America and France together. Lord North retained office, but he acknowledged to the king that his own



opinion was precisely the same as that of his late colleagues.

The year 1780 saw an agitation rising in the country for economical reform, an agitation very closely though indirectly connected with the war policy of the king. The public meetings held in the country on this subject have no unimportant place in the development of the constitution. Since the presentation of the Kentish Petition, in the reign of William III., there had been from time to time upheavings of popular feeling against the doings of the legislature, which kept up the tradition that parliament existed in order to represent the nation. But these upheavings had all been so associated with ignorance and violence as to make it very difficult for men of sense to look with displeasure upon the existing emancipation of the House of Commons from popular control. The Sacheverel riots, the violent attacks upon the Excise Bill, the no less violent advocacy of the Spanish war, the declamations of the supporters of Wilkes at a more recent time, and even in this very year the Gordon riots, were not likely to make thoughtful men anxious to place real power in the hands of the classes from whom such exhibitions of folly proceeded. But the movement for economical reform was of a very different kind. It was carried on soberly in manner, and with a definite practical object. It asked for no more than the king ought to have been willing to concede. It attacked useless expenditure upon sinecures and unnecessary offices in the household, the only use of which was to spread abroad corruption among the upper classes. George III. could not bear to be interfered with at all, or to surrender any element of power which had served him in his long struggle with the Whigs. He held out for more than another year. The news of the capitulation of York-Town reached London on November 25, 1781. On March 20, 1782, Lord North resigned.

George III. accepted the consequences of defeat. He called the marquis of Rockingham to office at the head of a ministry composed of pure Whigs and of the disciples of the late earl of Chatham, and he authorized the new ministry to open negotiations for peace. Their hands were greatly strengthened by Rodney's victory over the French fleet, and the failure of the combined French and Spanish attack upon Gibraltar; and before the end of 1782 a provisional treaty was signed with America, preliminaries of peace with France and Spain being signed early in the following year. On September 3, 1783, the definitive treaties with the three countries were simultaneously concluded.

Long before the signature of the treaties, Rockingham died (July 1, 1782). The king chose Lord Shelburne, the head of the Chatham section of the government, to be prime minister. Fox and the followers of Rockingham refused to serve except under the duke of Portland, a minister of their own selection, and resigned office. The old constitutional struggle of the reign was now to be fought out once more. Fox, too weak to obtain a majority alone, coalesced with Lord North, and defeated Shelburne in the House of Commons on February 17, 1783. On April 2d the coalition took office, with Portland as nominal prime minister, and Fox and North, the secretaries of state, as its real heads.

This attempt to impose upon him a ministry which he disliked made the king very angry. But the new cabinet had a large majority in the House of Commons, and the only chance of resisting it lay in an appeal to the country against the House of Commons. Such an appeal was not likely to be responded to unless the ministers discredited themselves with the nation. George III. therefore waited his time. Though a coalition between men bitterly opposed to one another in all politi-

cal principles and drawn together by nothing but love of office was in itself discreditable, it needed some more positive cause of dissatisfaction to arouse the constituencies, which were by no means so ready to interfere in political disputes at that time as they are now. Such dissatisfaction was given by the India Bill, drawn up by Burke. As soon as it had passed through the Commons the king hastened to procure its rejection in the House of Lords by his personal intervention with the peers. He authorized Lord Temple to declare in his name that he would count any peer who voted for the Bill as his enemy. On December 17, 1783, the Bill was thrown out. The next day ministers were dismissed. William Pitt (the younger) became prime minister. After some weeks' struggle with a constantly decreasing majority in the Commons, the king dissolved parliament on March 25, 1784. The country rallied round the crown and the young minister, and Pitt was firmly established in office.

Of the glories of Pitt's ministry this is not the place to write. That the king gained credit by them far beyond his own deserts is beyond a doubt. Nor can there be any reasonable doubt that his own example of domestic propriety did much to strengthen the position of his minister. It is true that that life was insufferably dull. No gleams of literary or artistic taste lightened it up. The dependants of the court became inured to dull routine, unchequered by loving sympathy. The sons of the household were driven by the sheer weariness of such an existence into the coarsest profligacy. But all this was not visible from a distance. The tide of moral and religious improvement which had set in in England since the days of Wesley brought popularity to a king who was faithful to his wife, in the same way that the tide of manufacturing industry and scientific progress brought popularity to the minister who in some measure translated into practice the principles of the *Wealth of Nations*.

The life of the king was suddenly clouded over. Early in his reign, in 1765, he had been out of health, and it is now known — what was studiously concealed at the time — that symptoms of mental aberration were even then to be perceived. In October, 1788, he was again out of health, and in the beginning of the following month his insanity was beyond a doubt. While Pitt and Fox were contending in the House of Commons over the terms on which the regency should be committed to the prince of Wales, the king was a helpless victim to the ignorance of physicians and the brutalities of his servants. At last Doctor Willis, who had made himself a name by prescribing gentleness instead of rigor in the treatment of the insane, was called in. Under his more humane management the king rapidly recovered. Before the end of February, 1789, he was able to write to Pitt thanking him for his warm support of his interests during his illness. On April 23d he went in person to St. Paul's to return thanks for his recovery.

The popular enthusiasm which burst forth around St. Paul's was but a foretaste of a popularity far more universal. The French Revolution frightened the great Whig land-owners till they made their peace with the king. Those who thought that the true basis of government was aristocratical were now of one mind with those who thought that the true basis of government was monarchical; and these two classes were joined by a far larger multitude which had no political ideas whatever, but which had a moral horror of the guillotine. As Elizabeth had once been the symbol of resistance to Spain, George was now the symbol of resistance to France. He was not, however, more than the symbol. He allowed Pitt to levy taxes and incur debt, to launch



armies to defeat, and to prosecute the English imitators of French revolutionary courses. At last, however, after the Union with Ireland was accomplished, he learned that Pitt was planning a scheme to relieve the Catholics from the disabilities under which they labored. The plan was revealed to him by the chancellor, Lord Loughborough, a selfish and intriguing politician who had served all parties in turn, and who sought to forward his own interest by falling in with the king's prejudices. George III. at once took up the position from which he never swerved. He declared that to grant concessions to the Catholics involved a breach of his coronation oath. All thinking men of a later generation are of opinion that the objection was untenable. But no one has ever doubted that the king was absolutely convinced of the serious nature of the objection, or that he believed the measure itself to be beyond calculation injurious to church and state. Nor can there be any doubt that he had the English people behind him. Both in his peace ministry and in his war ministry Pitt had taken his stand on royal favor and on popular support. Both failed him alike now, and he resigned office at once. The shock to the king's mind was so great that it brought on a fresh attack of insanity. This time, however, the recovery was rapid. On March 14, 1801, Pitt's resignation was formally accepted, and the late speaker, Mr. Addington, was installed in office as prime minister.

The king was well pleased with the change. He was never capable of appreciating high merit in any one; and he was unable to perceive that the question on which Pitt had resigned was more than an improper question, with which he ought never to have meddled. Addington was a minister after his own mind. Thoroughly honest and respectable, with about the same share of abilities as was possessed by the king himself, he was certainly not likely to startle the world by any flights of genius. But for one circumstance, Addington's ministry would have lasted long. So strong was the reaction against the Revolution, that the bulk of the nation was almost as suspicious of genius as the king himself. Not only was there no outcry for legislative reforms, but the very idea of reform was unpopular. The country gentlemen were predominant in parliament, and the country gentlemen, as a body, looked upon Addington with respect and affection. Such a minister was, therefore, admirably suited to preside over affairs at home in the existing state of opinion. But those who were content with inaction at home, would not be content with inaction abroad. In time of peace, Addington would have been popular for a season. In time of war, even his warmest admirers could not say that he was the man to direct armies in the most terrible struggle which had ever been conducted by an English government.

For the moment this difficulty was not felt. On October 1, 1801, preliminaries of peace were signed between England and France, to be converted into the definitive peace of Amiens on March 27, 1802. The ruler of France was now Napoleon Bonaparte, and few persons in England believed that he had any real purpose of bringing his aggressive violence to an end. "Do you know what I call this peace?" said the king; "an experimental peace, for it is nothing else. But it was unavoidable."

The king was right. On May 18, 1803, the declaration of war was laid before parliament. The war was accepted by all classes as inevitable, and the French preparations for an invasion of England roused the whole nation to a glow of enthusiasm only equaled by that felt when the Armada threatened the British shores. On October 26th, the king reviewed the London volunteers in Hyde Park. He found himself the

center of a great national movement with which he heartily sympathized, and which heartily sympathized with him.

On February 12, 1804, the king's mind was again affected. When he recovered, he found himself in the midst of a ministerial crisis. Public feeling allowed but one opinion to prevail in the country — that Pitt, not Addington, was the proper man to conduct the administration in time of war. Pitt was anxious to form an administration on a broad basis, including Fox and all prominent leaders of both parties. The king would not hear of the admission of Fox. His dislike of him was personal as well as political, as he knew that Fox had had a great share in drawing the prince of Wales into a life of profligacy. Pitt accepted the king's terms, and formed an administration in which he was the only man of real ability. Eminent men such as Lord Grenville refused to join a ministry from which the king had excluded a great statesman on purely personal grounds.

The whole question was reopened on Pitt's death on January 23, 1806. This time the king gave way. The ministry of All the Talents, as it was called, included Fox among its members. At first the king was observed to appear depressed at the necessity of surrender. But Fox's charm of manner soon gained upon him. On September 13th, Fox died, and it was not long before the king and the ministry were openly in collision. The ministry proposed a measure enabling all subjects of the crown to serve in the army and navy in spite of religious disqualifications. The king objected even to so slight a modification of the laws against the Catholics and Dissenters, and the ministers consented to drop the bill. The king asked more than this. He demanded a written and positive engagement that this ministry would never, under any circumstances, propose to him "any measure of concession to the Catholics, or even connected with the question." The ministers very properly refused to bind themselves for the future. They were consequently turned out of office, and a new ministry was formed with the duke of Portland as first lord of the treasury and Mr. Perceval as its real leader. The spirit of the new ministry was distinct hostility to the Catholic claims. On April 27, 1807, a dissolution of parliament was announced, and a majority in favor of the king's ministry was returned in the elections which speedily followed.

The elections of 1807, like the elections of 1784, gave the king the mastery of the situation. In other respects they were the counterpart of one another. In 1784 the country declared, though perhaps without any clear conception of what it was doing, for a wise and progressive policy. In 1807 it declared for an unwise and retrogressive policy, with a very clear understanding of what it meant. It is in his reliance upon the prejudices and ignorance of the country that the constitutional significance of the reign of George III. appears. Every strong government derives its power from its representative character. At a time when the House of Commons was less really representative than at any other, a king was on the throne who represented the country in its good and bad qualities alike, in its hatred of revolutionary violence, its moral sturdiness, its contempt of foreigners, and its defiance of all ideas which were in any way strange. Therefore it was that his success was not permanently injurious to the working of the constitution as the success of Charles I. would have been. If he were followed by a king less English than himself, the strength of representative power would pass into other hands than those which held the scepter.

The overthrow of the ministry of All the Talents was the last political act of constitutional importance in which George III. took part. The substitution of



Perceval for Portland as the nominal head of the ministry in 1809 was not an event of any real significance, and in 1811 the reign practically came to an end. The king's reason finally broke down after the death of the Princess Amelia, his favorite child. The remaining nine years of his life were passed in insanity and blindness, and when he died on January 29, 1820, in his eighty-second year, no political results were to be anticipated. George III. had nine sons and six daughters.

GEORGE IV. (*George Augustus Frederick*), lived long enough to strip the crown of the leadership of the nation which his father had won for it. Born on August 12, 1762, he was noted in the years of his early manhood for good looks, for ease of carriage, and graciousness of manner. He soon plunged into the whirl of sensual excitement. His life was passed in the grossest profligacy. He was false as well as licentious. His word was never to be trusted. Not even an occasional gleam of brightness lights up the dark picture of his career.

The prince fell in love with Mrs. Fitzherbert who had been twice a widow at twenty-five. She was ready to marry him, but she would yield to him on no other terms. She was a Roman Catholic, and a marriage of the heir of the crown with a Roman Catholic forfeited his succession by the Act of Settlement. Mrs. Fitzherbert, holding that the performance of the ceremony by a priest of her church was of sacramental efficacy, was indifferent to the legality of the proceeding. The marriage took place.

In 1795 the prince married Caroline of Brunswick, because his father would not pay his debts on any other terms. Her behavior was light and flippant, and he was brutal and unloving. The ill-assorted pair soon parted, and soon after the birth of their only child, the Princess Charlotte, they were formally separated. In 1811 the prince at last became regent in consequence of his father's definite insanity. The disgust which his profligate and uxorious life caused among a people suffering from almost universal distress after the conclusion of the war of 1815 rapidly increased. In 1817 the windows of the prince regent's carriage were broken as he was on his way to open parliament.

The death of George III. on January 29, 1820, gave to his son the title of king without in any way altering the position which he had now held for nine years. The relations between the new king and his wife unavoidably became the subject of public discussion. The accession of George IV. brought matters to a crisis. He ordered that no prayer for his wife as queen should be admitted into the Prayer Book. She at once challenged the accusation which was implied in this omission by returning to England. On June 7 she arrived in London. Before she left the Continent she had been informed that proceedings would be taken against her for adultery if she landed in England. Two years before, in 1818, commissioners had been sent to Milan to investigate charges against her, and their report, laid before the cabinet in 1819, was made the basis of the prosecution. On the day on which she arrived in London a message was laid before both houses recommending the criminating evidence to parliament. A secret committee in the House of Lords, after considering this evidence, brought in a report on which the prime minister founded a Bill of Pains and Penalties to divorce the queen and to deprive her of her royal title. The Bill passed the three readings with diminished majorities, and when on the third reading it obtained only a majority of nine, it was abandoned by the Government. The king's unpopularity, great as it had been before, was now greater than ever. Public opinion, without troubling itself to ask whether the queen was guilty or

not, was roused to indignation by the spectacle of such a charge being brought by a husband who had thrust away his wife to fight the battle of life alone, without protection or support, and who, while surrounding her with spies to detect, perhaps to invent, her acts of infidelity, was himself living in notorious adultery. In the following year (1821) she attempted to force her way into Westminster Abbey to take her place at the coronation. On this occasion the popular support failed her; and her death not long afterward relieved the king from further annoyance. George IV. died on June 26, 1830.

GEORGE OF CAPPADOCIA, who from 356 to 361 was Arian archbishop of Alexandria, was born about the beginning of the fourth century. According to Amianus he was a native of Epiphania in Cilicia; but universal tradition makes him a Cappadocian.

GEORGE, SAINT, according to Metaphrastes, the Byzantine hagiologist, whose narrative is substantially repeated in the Roman *Acta Sanctorum* and in the Spanish breviary, was born in Cappadocia. He suffered martyrdom in 303 A. D.

The popularity of the name of St. George in England dates from the time of Richard Cœur de Lion, who, it was said, had successfully invoked his aid during the first crusade; but it was not till the time of Edward III. that he was made patron of the kingdom, although at the council of Oxford, in 1222, it had already been ordered that his feast should be kept as a national festival. The republics of Genoa and Venice were also under his protection; and his name is much revered in all the Oriental churches.

GEORGE, known as PISIDES or PISIDA, a Byzantine writer of the seventh century, was, as his surname implies, a native of Pisidia; but of his personal history nothing is known, except that he had been ordained a deacon, and that he held, either simultaneously or successively, several offices in the "Great Church" (that of St. Sophia) at Constantinople.

GEORGE, OF TREBIZOND, one of the distinguished writers in the great controversy between Aristotelianism and Platonism, in the fifteenth century, was born at Chandace, in the island of Crete, in 1396, and died at Rome in 1486.

GEORGETOWN, formerly a city of the District of Columbia, of which it was the port of entry, has, since 1878, been incorporated in the city of Washington, under which head it will be treated.

GEORGETOWN, known as Stabroek during the Dutch period, now the capital of British Guiana, is situated in the county of Demerara on the east bank of the Demarara river, about a mile from its mouth. It is one of the prettiest towns of that part of the world, and presents an unusually attractive appearance to the approaching voyager. Population (1890) about 40,000.

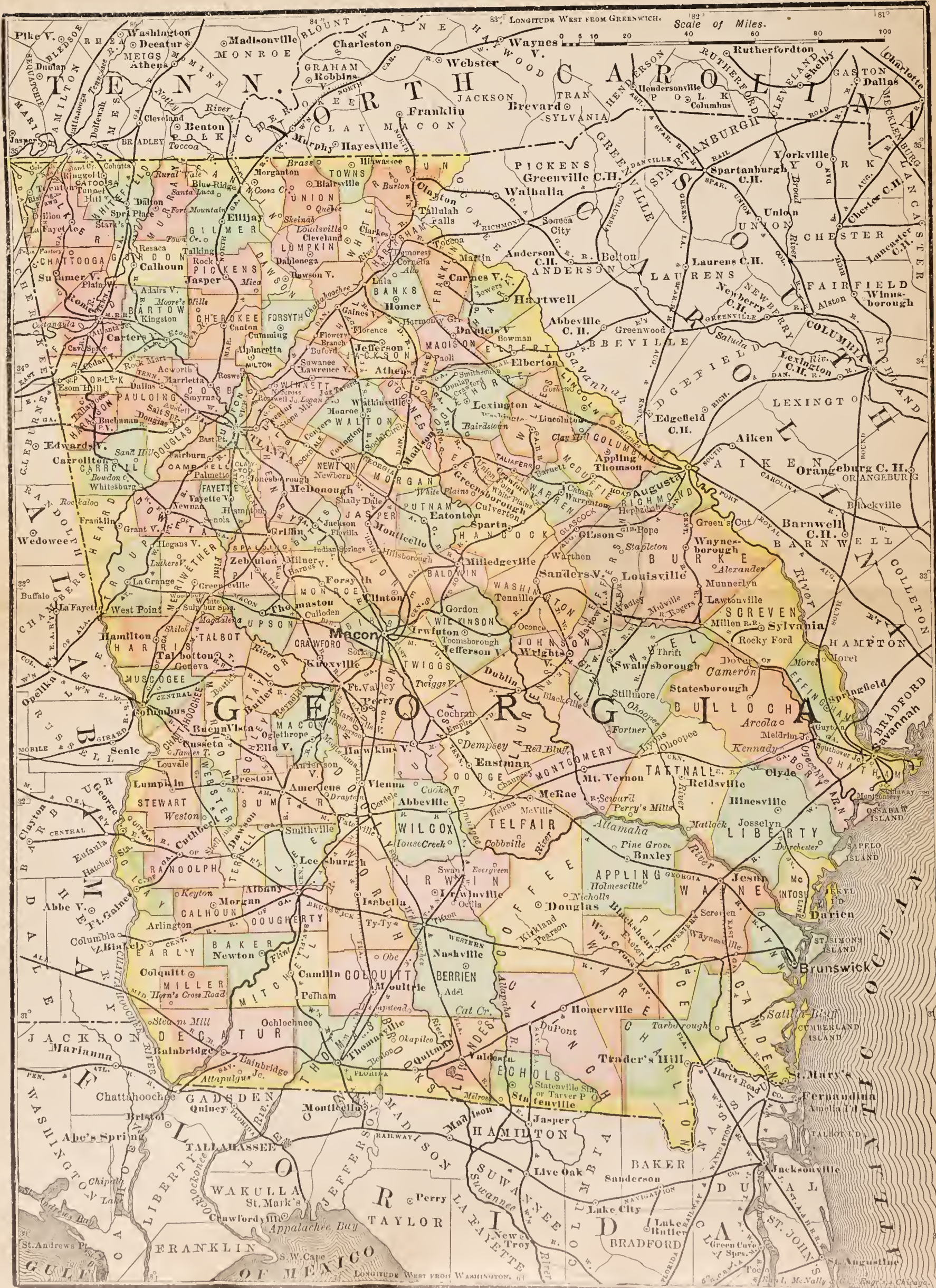
GEORGIA, a kingdom in Central Transcaucasia, remarkable for the long list of its sovereigns, the monarchy having extended over a period of upward of 2,000 years, the kings reigning at times independently, or under the rule of Persia, Turkey, or the Eastern empire. The earliest name of the country was Karthli; the ancients knew it as Iberia, bounded on the one side by Colchis and on the other by Albania; and it has for centuries been called Georgia.

Georgia proper, which includes Karthli and Kakhetia, is bounded on the north by Ossety and Daghestan, on the east by Shekynn, on the south by Shamshady and the khanates of Erivan and Kars, and on the west by Gouria and Imeritia; but the kingdom at times included Gouria, Mingrelia, Abkhasia, Imeritia, and Daghestan, and extended from the great mountain range to the Araxes. It now forms the government of Tiflis, divided











into the districts of Doushett, Telav, Sygnah, Gori, and Akhalzikh, having an area of nearly 25,000 square miles, and in 1889 a population of 700,000, made up chiefly of Georgians and Armenians—there being also Persians, Tartars, and a few Jews and Europeans. The chief city is the ancient capital of Tiflis, the seat of government, under a governor general, for the whole of Transcaucasia, and the principal center of commerce.

The valleys and declivities are fertile, producing maize, millet, barley, oats, rice, beans, lentils, and corn, also cotton, flax, and hemp, now exported exclusively to Russia. The vineyards cover 75,400 acres, the average produce of wine being at the rate of 230 gallons per acre; the valley of the Alazan yields the best qualities.

The domestic animals are the camel, ox, mule, ass, and buffalo as beasts of burden, with the goat, and an immense number of pigs, pork being favorite food. The horse—small, hardy, and enduring—is ridden, more frequently unshod, except in the hills, no pains are taken to improve the breed. The wild animals of greatest importance are bear, ibex, wolf, hyæna, fox, wild boar, wild goat, and antelope; while the pheasant, woodcock, quail, and “partridge of the Caucasus” are the principal winged game. The fish taken in the Kour and other rivers are the sturgeon, silurus, carp, perch, trout, gudgeon, and a fish resembling the salmon, called *oragoula* by the Georgians. The great sturgeon, *belouga* or hansen, is taken at the estuary of the Kour in the Caspian.

*History.*—The material at the disposal of the historian of Georgia is scanty. An anonymous work of the twelfth century gives the history from the earliest times to the year 1124; another, also anonymous, is a continuation to the division of the kingdom in 1445; and a third is the compilation by the Czarevitch Wakhoucht, being the complete annals from the earliest times to the year 1745. These, and a few pamphlets indifferently edited, if we except the memoirs of his family by Stephen Orbeliani, archbishop of Siouny in the thirteenth century, comprise all that is left to us during an interval of upward of 2,000 years.

*Ethnology.*—Of the three main groups into which the Caucasian races are now usually divided, the Georgian is in every respect the most important and interesting. It has accordingly largely occupied the attention of Orientalists almost incessantly from the days of Klaproth to the present time. Yet such are the difficulties connected with the origin and mutual relations of the Caucasian peoples that its affinities are still far from being clearly established.

The Georgian race, which represents the oldest elements of civilization in the Caucasus, is distinguished by some excellent mental qualities, and is especially noted for personal courage and a passionate love of music. The people, however, are described as fierce and cruel, and addicted to the vice of intemperance, though Von Thielmann speaks of them as “rather hard drinkers than drunkards.” Physically they are a fine athletic race of pure Caucasian type; hence during the Moslem ascendancy Georgia supplied, next to Circassia, the largest number of female slaves for the Turkish harems and of recruits for the Osmanli armies, more especially for the select corps of the famous Mameluks.

The social organization rested on a highly aristocratic basis, and the lowest classes were separated by several grades of vassalage from the highest. But since their incorporation with the Russian empire, these relations have become greatly modified, and a more sharply defined middle class of merchants, traders, and artisans has been developed. The power of life and death, formerly claimed and freely exercised by the nobles over their serfs, has also been expressly abolished. They

are altogether at present in a fairly well-to-do condition, and it cannot be denied that under the Russian administration they have become industrious, and have made considerable moral and material progress.

Missionaries sent by Constantine the Great introduced Christianity about the beginning of the fourth century. Their efforts were greatly aided by the exemplary life of a female slave named Nina, who came into Georgia during the reign of King Miriam (265–318), and who occupies a prominent place in the ecclesiastical records of the country. Since that time the people have, under severe pressure from surrounding Mahometan communities, remained faithful to the principles of Christianity, and are still among the most devoted adherents of the orthodox Greek Church. Indeed it was their attachment to the national religion that caused them to call in the aid of the Christian Muscovites against the proselytizing attempts of the Shiite Persians—a step which ultimately brought about their political extinction.

GEORGIA, one of the South Atlantic States of the American Union, is bounded on the north by Tennessee and North Carolina; on the east by South Carolina and the Atlantic Ocean; on the south by Florida, and on the west by Alabama. The early history of Georgia is widely different from that of the other twelve colonies—itsself forming one of the original thirteen. Its inception was different and it was peopled by a different class of immigrants—being the only one of the colonies in which the government of England took a patronizing and fostering interest. The other colonies were the results of individual enterprise, while the settlement of Georgia was an affair in which the government participated and to which it gave aid. The first English settlement in the State was made in 1733, by a band of immigrants under the direction of Gen. James Oglethorpe, who first landed at Savannah in February of that year. Other settlements were made by the English at Darien, St. Simon and Augusta. By 1736 the colony had grown considerably, having received additions from England and other European countries. The early prosperity of the colony was somewhat disturbed by the war between the English and Spaniards, which latter nation had already taken possession of Florida and also claimed Georgia. The English were victorious, however, and succeeded in putting a quietus to all attempts of the Spaniards to make good their claim to the territory occupied by Oglethorpe's colonists. The relations between the Indians (of whom there were two powerful tribes—the Cherokees and the Creeks) and the settlers at first were amicable, and were never disturbed until the French and Indian war, during which the Cherokees plundered and burned some of the remote frontier hamlets and killed a few of the settlers. After remaining under the rule of a board of trustees for a period of nineteen years the government of the colony was transferred to the home administration and a royal governor and council were appointed to administer the affairs of the colony. The extent of the territory comprised in the original colony was much greater than the area of the present State, and by treaty with France and Spain at one time it extended to the Mississippi river on the west and included a goodly portion of Florida on the south.

When the revolutionary war began, Georgia was in a flourishing condition, having a population, including negroes (slavery having been introduced in 1750), estimated at over 75,000. She immediately took part in the struggle, and her representatives were among the signers of the declaration of independence. The State was destined to become the scene of important military operations during the progress of the war, and several hard-fought battles between the British on the one side,



and the French and Americans on the other, took place, those of greatest magnitude being at Augusta and Savannah. Although defeated and compelled to abandon Augusta at first, the British recaptured the town, and held Savannah and the entire State in subjection (with the exception of minor guerrilla warfare) until General Greene succeeded in forcing them to retire, in 1782, after the surrender of Cornwallis, and before the signing of the treaty of peace between England and America. Several years after her entrance into the sisterhood of States, Georgia discarded the constitution which she had originally ratified in 1777. In 1798 she adopted a third constitution, which, with various amendments added, was the instrument in force until after the rebellion. In 1803 two new territories were erected out of her domains, and these were afterward admitted to the union as the States of Mississippi and Alabama, which loss of territory was, in a measure, compensated by possession of the large tract of country before that time occupied by the Creek Indians, who ceded it to the State in 1804. From 1815 to 1825 the troubles between the whites and Indians were of a nature so serious that the general government had to interfere and remove the Indians beyond the Mississippi. The beginning of these troubles lay in the incitement by the British (at that time at war with the United States) of the savages to acts of hostility, and they were only subdued after a desperate conflict with the troops of General Jackson. But the troubles were continually renewed, the Indians assassinating one of their chieftains who had negotiated a treaty ceding lands to the whites, until finally the national government intervened, with the result stated.

When the civil war broke out, in 1861, Georgia followed in the wake of South Carolina, passing the ordinance of secession, being the fifth State in order of priority to leave the Union. Almost immediately her territory became the scene of military operations, the first of any considerable importance being the assault and capture of Fort Pulaski by the United States navy and the subsequent occupation of various other points by Federal troops. After the defeat of the Confederate forces at Chickamauga and Chattanooga the Federal forces, under General Sherman, were pushed rapidly forward against the confederates, who were at Dalton, Ga., and joined battle with them at Resaca, Kingston and Alatoona Pass, and at various other places numerous bloody skirmishes took place. Atlanta fell before the victorious arms of Sherman in September, 1864, and thence that general took up his "march to the sea," appearing before Savannah, December 10, 1864. After two weeks' hard fighting he succeeded in capturing the defenses and occupied the city. After the fall of the Confederacy Jefferson Davis fled to Georgia, and was captured near Macon by a detachment of Federal cavalry, which had previously invaded the State and taken various points of importance.

The history of Georgia, since the war, has been one of steady progress. Hardly had the throes of the great rebellion passed away before the work of reconstruction and rehabilitation began. In the fall of 1865 the first steps were taken, by a convention held at Milledgeville (then the capital of the State), which expunged the ordinance of secession from the statute book, acquiesced in and ratified the emancipation proclamation of the president, and voided all public debts on account of the war. In 1868 a constitution was framed—consisting of portions of the constitution of '98, with numerous and radical amendments—and the State government was organized by the inauguration of Rufus B. Bullock as governor. Five years after the war, Georgia was in full possession of all her rights as a State of the Union, and her reconstruction was complete. At this period

of her history, the condition of the State was appalling, and the future presented a dreary outlook for her; but with unexampled energy and pluck, her people went to work to retrieve their fallen fortunes; and at present (1891), no Southern State has a brighter future in prospective than Georgia. Her natural resources are enormous, and her productions are varied almost to infinity, and, if properly fostered, will be a source of inexhaustible wealth. Manufactures and agriculture have been rejuvenated, and new enterprises inaugurated. In 1877 a new constitution (the seventh), was adopted, under which the State has progressed in every way, both politically and commercially.

The natural features of the State present almost infinite variety, both as regards its topographical and geological structure. Its total area is about 60,000 square miles, and within these limits may be found representatives of almost all the geological periods of the earth's formation. Its river systems are magnificent, and add greater beauty to a country whose other characteristics are so disposed as to present a grandeur of scenery and variety of productions and climate rarely met with. The State is particularly rich in minerals, nearly every important natural deposit in the catalogue being found in one or the other portion of her domain. Metals from gold to iron abound in large quantities, while stones and rocks of various degrees of value and usefulness, together with coal, await but the necessary capital (of late rapidly forthcoming) to make them available and add to the material prosperity of the people. Its vegetation includes almost the entire range of the temperate and sub-tropical regions, embracing in its flora, sylvia and grasses many of the most valuable, useful and beautiful of each. The climate is equally diversified, and, while in some places—particularly in the alluvions—malarial and unhealthy, yet in the higher lands the air is salubrious and bracing, and the mortality statistics of the country will compare favorably with those of any other State of the Union. The range of the thermometer is very slight, being usually between 95° maximum in summer and 10° minimum in winter; only in exceptionally severe seasons does the mercury sink to the neighborhood of 0, and the severest weather known to occur was only 5° below.

The food crops consist generally of rice, sugar-cane, sweet potatoes and corn, with a moderate supply of wheat. Cotton, hay and various food grasses grow most abundantly, while the ranges of pine and other forests furnish a generous sustenance for stock and swine.

The fruits represented comprise apples, pears, peaches, oranges, lemons, bananas, together with grapes, cherries and other small fruits. Tobacco grows well, while occasionally rye, oats and barley are met with. Peanuts form an important article of agricultural production. But it is to manufactures that Georgia must look for most of her prosperity. These embrace cotton goods, steel, iron, lumber, tar, pitch, turpentine, cottonseed oil, tobacco, machinery, paper, etc., and their estimated value is over \$80,000,000 annually.

Railroad building has exhibited great activity of late years, and the total mileage within the State is 3,278 miles. The Central Railroad has, in addition to its line of road, a fleet of ocean steamships, plying between New York and Philadelphia and Savannah. And there are numerous other lines of steamers touching at various points along the coast. The foreign commerce of the State is of considerable importance, there being three ports of entry within her bounds. Some fishery interests exist, both coastal and river. In 1881 a national exposition was held at Atlanta, and was a great factor in disseminating knowledge in regard to the possibilities



of the region. This city, which about 1860 was made capital of the state, is now the largest in the State, and one of the most beautiful cities in the South. The other principal cities of the State are Savannah Augusta, Macon, Columbus, Athens and Milledgeville.

The public school system of the State is on a firm basis, and efficiently administered, and in points of material prosperity the outlook for Georgia is bright. The population of the State in 1880 was 1,542,180, and the United States census of 1890 gave 1,837,353. The present Governor (1891) is W. J. Northen.

The following statistics will be of interest as exhibiting the present condition of the State:

The Comptroller-General in his report for the fiscal year ending Sept. 30, 1890, presents the following figures: Balance in Treasury, Oct. 1, 1889, \$430,191.01; receipts from all sources to Sept. 30, 1890, \$3,977,694.22; total, \$4,409,885.23. Total payments by Treasurer, \$2,131,793.08; balance in Treasury, Oct. 1, 1890, \$2,778,092.15. The assessed value, which in 1879 was \$234,959,548, has increased in 1890 to \$415,828,945. Comparing 1890 with 1889 the increase in the valuation was \$35,519,548, while in the twelve years named the increase was in round numbers almost \$180,000,000.

The bonded debt of the State on Oct. 1, 1890, amounted to \$10,359,340, on which the annual interest charge is \$380,660. This includes bonds issued in aid of railroad construction, obligations to the State University, and all other bonded indebtedness of the State.

Provision was made by the legislature of 1887 for gradually reducing the debt by creating a sinking fund for the years 1887 and 1888 and 1897 to 1915, inclusive, thus carrying into effect the clause of the State Constitution, requiring that \$100,000 should be raised each year by taxation, and held as a sinking fund, for the payment of state bonds.

Georgia possesses a flourishing school system. In 1889 the enrollment of school population was; white, 209,276; colored, 133,220, a total of 342,496; being an increase of 21,320 over the previous year. The average attendance was 230,384, also showing a gratifying increase of over 12,000. The receipts of the school fund for 1890 aggregated \$643,420, of which \$330,000 was received from tax assessment, \$50,575 from excess tax on taxable property above \$360,000,000; \$150,000 from rental of State railroad and \$71,861 from liquor tax. There was, after paying certain small sums, left \$638,656 to be apportioned, to which \$188,000 must be added on account of receipt from poll-tax, making an available total for school purposes of \$826,656. The gross sum raised by the State for school purposes in 1889 was \$683,380.50 and by counties and cities under local laws \$337,814.53, or a total of \$1,021,195.03. The State Lunatic Asylum is the largest and most expensive charity of the State. In 1887 it contained 910 white and 385 colored patients, a total of 1,295. This total had increased on October 1, 1888, to 1,386, of whom 980 were white and 406 colored patients. The cost of supporting the institution in 1890 was \$185,000.

The Georgia Academy for the Blind had ninety-one pupils in attendance during the two years, seventy-eight white and thirteen colored. The appropriation for this institution in 1890 was \$16,000. The institution for the Deaf and Dumb has an average attendance of nearly one hundred pupils. In 1890 the appropriation for this institution was \$17,000.

GEORGSWALDE, a town of Northern Bohemia, on the borders of Saxony, in the circle of Leitmeritz, about 35 miles east of Dresden, with a station on the North Bohemian railway. Besides Old and New Georgswalde, it comprises Wiesenau and Philippsdorf, the latter a place which, since 1868 has attained celebrity through

the miracles attributed to its image of the Virgin. Georgswalde was founded in the beginning of the 17th century, and ranks as one of the oldest industrial centers of Bohemia, sharing with the neighboring town of Rumburg a reputation of excellent linen. The parish church is a fine building. Population, 1890, 12,000.

GERA, the chief town of the principality of Reuss-Schleiz, stands in a valley on the banks of the White Elster, 35 miles south-southwest of Leipsic. It has been all rebuilt since a great fire in 1780, and the streets are in general wide and straight, and contain many handsome houses. The principal buildings are the churches of St. Salvator's and St. Trinity, the town hall, the buildings of the imperial bank and of the Gera bank, the music hall and the central hall. Population, 22,000.

GERANIUM is the name of a genus of polypetalous exogenous plants, which is taken by botanists as the type of the natural order *Geraniaceae*.

The species of *Geranium* bear the English name of Cranesbill, and consist mostly of herbs, of annual or perennial duration, dispersed throughout the temperate regions of the world. They number nearly a hundred, and bear a considerable family resemblance. The leaves are for the most part palmately-lobed, and the flowers are regular, consisting of five sepals, five imbricating petals, alternating with five glandules at their base, ten stamens, and a beaked ovary. The genus is not without its virtues, *G. maculatum* being the alum-root of North America, used as an astringent in diarrhoea, dysentery, and such like complaints, while the Herb Robert of English hedgesides, *G. Robertianum*, which is both astringent and aromatic, is used as a remedy in nephritic disorders.

GERARD OF CREMONA, the mediæval translator of Ptolemy and Avicenna, was born at Cremona, Lombardy, in 1114. His original version of Avicenna's *Canon of Medicine* was the basis of all the very numerous subsequent Latin editions of that well-known work; and the Latin translation by which alone Ptolemy's *Almagest* until the discovery of the original was known to Europe is also ascribed to him. In addition to these, he translated various other treatises in medicine, mathematics, and astronomy, to the number, it is said, of sixty-six; but some of the works with which he has been credited (including the translation of the *Almansorius* of Er-Razi or Rhazes) are more probably due to the later Gerard also called "Cremonensis," but more precisely "de Sabloneta." He died in 1187.

GERARD, variously surnamed TUM, TUNC, TENQUE, or THOM, founder of the order of the knights hospitalers of St. John or of Malta, was born at Amalfi about the year 1040. Whether as a soldier or a merchant, he in the course of the latter part of the eleventh century found his way to Jerusalem, where a hospice had for some time existed for the convenience of those who wished to visit the holy places. Of this institution Gerard became guardian or provost at a date not later than 1100; and here he organized that religious order of St. John which received papal recognition from Pascal II., in 1113, by a bull which was renewed and confirmed by Calixtus II. shortly before the death of Gerard, in 1120.

GÉRARD, ÉTIENNE MAURICE, COUNT, a distinguished French general, was born at Damvilliers in the department of Meuse, 1773. After various services under the revolutionary government, the first empire, the restored Bourbons, the second revolutionary government, and the second restoration, he finally accepted office under the republic, and then the second empire, of which he became a senator, and died in April, 1852.

GÉRARD, FRANÇOIS. BARON, was born on May 4,



1770, at Rome, where his father occupied a post in the house of the French Ambassador. At the age of twelve Gérard left Rome with his family for Paris.

Here he perfected himself in the art of painting and executed some famous pictures, and was the recipient of many royal favors. But the exciting scenes of the French revolutions proved too much for him, and he died of fever January 11, 1837.

GÉRARD, JEAN IGNACE ISIDORE, a French caricaturist generally known by the pseudonym of Grandville—the professional name of his grandparents, who were actors—was born at Nancy, September 13, 1803. The work which first established his fame was *Métamorphoses du jour*, published in 1828. He died of mental disease 1847.

GERARD, JOHN, herbalist and surgeon, was born toward the end of 1545, at Nantwich, in Cheshire. He died in February, 1612.

GÉRARD DE NERVAL is the adopted name of Gérard Labrunie, a French litterateur, and that by which he is generally known. The son of an officer in the army, he was born at Paris, May 21, 1808. From 1841 he was subject to periodical attacks of insanity, and he committed suicide by hanging, 1855. The literary style of Gérard is simple and unaffected, and he has a peculiar faculty of giving to his imaginative creations an air of naturalness and reality.

GERASA, the modern GERASH, or JERASH, a city of Palestine, in the Decapolis of Peræa, situated amid the mountains of Gilead, at a distance of twenty miles from the Jordan, and twenty-one miles to the north of Philadelphia. Of its origin nothing is known.

GERBA or JERBA, an island off the African coast in the Gulf of Gabes, belonging to the regency of Tunis. It is flat and well wooded with date palms, has an area of 425 square miles, and contains a population of 30,000. Most of the inhabitants are of Berber origin, though a certain proportion have adopted the Arabic language. About 5,000 Jews live apart in villages of their own, and a number of European merchants are settled in the chief town of Haunt-es-Suk for the purposes of trade.

GERBER, ERNST LUDWIG, author of the well-known dictionary of musicians, was born at Sondershausen September 29, 1746. He died at Sondershausen June 30, 1819.

GERBERON, GABRIEL, a Jansenist monk, one of the most diligent students and prolific writers of his century, was born August 12, 1628, at St. Calais, in the department of Sarthe. He died at the abbey of St. Denis on March 29, 1711.

GERBERT. See SILVESTER II.

GERBERT, MARTIN, a catholic prelate and writer on church music, was a descendant of the Gerberts of Hornau, and was born at Horb on the Neckar, Würtemberg, August 12, 1720. He died May 3, 1793.

GERHARD, FRIEDRICH WILHELM EDUARD, a distinguished German archæologist, was born at Posen, November 29, 1795. He died at Berlin May 12, 1867.

GERHARD, JOHANN, one of the ablest and most learned exponents of Lutheran orthodoxy, was born in Quedlinburg, October 17, 1582. He died on August 20, 1637. Personally he is said to have exhibited a rare combination of all the best elements of the Christian character; the only failing imputed to him by any one decidedly leans to virtue's side—an excessive love of peace.

GERHARDT, CHARLES FREDERIC, was born at Strasburg, August 21, 1816, and died there August 19, 1856. Gerhardt's contributions to chemistry are less discoveries of new facts, than of new ideas which organized and vitalized an inert accumulation of facts. He developed the notion of types of structure and reaction;

he discovered the order of organic compounds, which led him to the doctrine of homologous and other series; and on theoretical grounds he remodeled the whole character of the combining weights upon the two-volume molecular basis. The bare statement, however, of his results give no idea of the lucidity, the wealth of thought, the grasp of the entire subject, which his memoirs and his longer works display.

GERHARDT, PAUL, the greatest hymn-writer of Germany, if not indeed of Europe, was born at Gräfenhainichen, a small town on the railway between Halle and Wittenberg, in 1606 or 1607—some authorities, indeed, give the date March 12, 1607. but neither the year nor the day is accurately known. In 1668 he was appointed archdeacon of Lübben in the duchy of Saxe-Merseburg, where, after a somewhat somber ministry of eight years, he died on June 7, 1676.

GÉRICAUT, JEAN LOUIS ANDRÉ THÉODORE, French painter, who led the inevitable reaction which set in under the empire against the fixed and strictly limited aims of the school of David, was born at Rouen in 1791. On January 26, 1824, he died at the age of thirty-three. That which he left us is effective only as a protest; his work, like his life, lacked the fixity of conscious purpose necessary to the task of reconstruction. Had he steadied himself and survived the abuse of his powers, he might have played an important part in determining the course of the modern school. for, though no colorist, he was in other respects richly endowed, and was possessed by a rare energy which redeemed even that tendency to undue emphasis which gives a theatrical character to much of the best French work.

GERIZIM ("the desert hill," or, according to others, "the hill of the Gerizzites"), the third highest mountain of Samaria, is situated at the western extremity of the fertile plain of Mochna, and with Mount Ebal, which lies immediately to the north, forms a narrow valley in which lies the ancient town of Sichem or Shechem.

GERMAN CATHOLICS, the name assumed in Germany toward the close of the year 1844 by certain dissentients from the church of Rome. The most prominent leader of the German Catholic movement was Johann Ronge, a Roman Catholic priest, who in October, 1844, made a vigorous attack upon Arnoldi, bishop of Treves, for having made a relic, which he alleged to be the holy seamless coat of Christ, an object of pilgrimage and adoration. On Ronge's excommunication on this account, by the chapter of Breslau in December, 1844, he received a large amount of public sympathy, and a dissenting congregation was almost immediately formed at Breslau with a very simple creed, in which the chief articles were belief in God and Father, creator and ruler of the universe; in Jesus Christ the Saviour, who delivers from the bondage of sin by his life, doctrine, and death; in the operation of the Holy Ghost; in a holy, universal Christian church; in forgiveness of sins and the life everlasting. Within a very few weeks similar communities had been formed at Leipsic, Dresden, Berlin, Offenbach, Worms, Wiesbaden, and elsewhere; and at a "council" convened at Leipsic in March, 1845, twenty-seven congregations were represented by delegates, of whom, however, only two or at most three were in clerical orders. Almost contemporaneously with the commencement of the agitation led by Ronge, another movement fundamentally distinct, though in some respects similar, had been originated at Schneidemühl, Posen, under the guidance of Johann Czerski, also a priest, who had come into collision with the church authorities on the then much discussed question of mixed marriages, and also on that



of the celibacy of the clergy. The result had been his suspension from office in March, 1844; his public withdrawal, along with twenty-four adherents, from the Roman communion in August; his excommunication immediately thereafter; and the formation, in October, of a "Catholic Apostolic Christian" congregation which, while rejecting various practices of the Roman Church, retained the Nicene theology and the doctrine of the seven sacraments. Czerski had been at some of the sittings of the "German Catholic" council of Leipzig; but when a formula somewhat similar to that of Breslau had been adopted, he refused to adhibit his signature because the divinity of Christ had been ignored, and he and his congregation continued to retain by preference the name of "Catholic Apostolic Christians," which they had originally assumed. Of the German Catholic congregations which had been represented at Leipzig some manifested a preference for the fuller and more positive creed of Schneidemühl, but a great majority continued to accept the comparatively negative theology of the Breslau school. The number of these increased with considerable rapidity, until in June, 1846, in Silesia alone the members of the German Catholic communion were reckoned by thousands, while the congregations scattered over Germany amounted in all to 173. In Austria, however, and ultimately also in Bavaria, the use of the name German Catholics was officially prohibited, that of "Dissidents" being substituted, while in Prussia the adherents of the new creed were laid under various disabilities; these and other circumstances, among which the frequent occurrence of internal dissensions was perhaps the gravest, conspired to check at an early stage the prosperous career of a movement which in its beginnings had been looked upon by many intelligent observers with considerable hopefulness. In 1859 some of the German Catholics entered into a union with the "Free Congregations," when the united body took the title of "The Religious Society of Free Congregations." Before that time many of the congregations which were formed in 1844 and the years immediately following had been dissolved, including that of Schneidemühl itself, which ceased to exist in 1857. No very recent statistics of a trustworthy kind as to the numerical strength of the German Catholics are accessible.

GERMANICUS, CÆSAR, a distinguished Roman general and provincial governor in the reign of Tiberius, was born 15 B.C., and died 19 A.D. His name Germanicus, the only one by which he is known in history, he inherited from his father Claudius Drusus Nero, the stepson of Augustus, and the most famous of his generals.

Of the early years and education of Germanicus little is known. In 12 A.D. he was made consul, though he had neither attained the legal age nor passed through the grades of prætor and ædile. Soon afterward he was appointed by Augustus to the important command of the eight legions on the Rhine. The news of the emperor's death found Germanicus at Lugdunum, where he was superintending the census of Gaul. Close upon this came the report that a mutiny had broken out among his legions on the lower Rhine. Germanicus hurried back to the camp, which was now in open insurrection. The tumult was with difficulty quelled, partly by well-timed concessions for which the authority of the emperor was forged, but mostly by the help of his personal popularity with the troops. Some of the insurgents actually proposed that he should put himself at their head and secure for himself the empire, but their offer was rejected with righteous horror. In order to calm the excitement and prevent further dissatisfaction, Germanicus determined at once on an active campaign.

Crossing the Rhine as the head of 12,000 legionaries and an equal number of allied troops, he attacked and routed the Marsi, and laid waste the valley of the Ems. In the following year he marched against Arminius, the conqueror of Varus, and reached the fatal battlefield in the Teutoburg Forest. The bones of the Roman soldiers still lay bleaching on the ground near the altars where their tribunes had been immolated, and the gibbets where the prisoners had been hanged. Having performed the last rites and erected a barrow to mark the spot, he led his army on, breathing vengeance against the foe. Arminius, however, favored by the marshy ground, was able to hold his own, and it required another campaign before he was finally defeated. A masterly combined movement by land and water enabled Germanicus to concentrate his forces against the main body of the Germans encamped on the Weser, and to crush them in two obstinately contested battles.

But no more victories were in store for Germanicus. His success had already stirred the jealousies and fears of Tiberius, and he was reluctantly compelled to obey the imperial summons and repair to Rome. The recent death of Archelaus, king of Cappadocia, and a disputed succession in Parthia and Armenia, afforded a sufficient plea for Roman interference; and, a few months after his return, Germanicus was dispatched to the East with extraordinary powers, and started on his mission without waiting to enter on his consulship. At the same time Tiberius took the further precaution of superseding Silanus, a connection of Germanicus, in the government of Syria, and appointing in his stead one of the most violent and ambitious of the old nobility, Cneius Calpurnius Piso, in order to watch his nephew's movements, and if necessary to check his ambition. Germanicus proceeded by easy stages to his province, halting on his way in Dalmatia, where he conferred with Drusus, his brother by adoption, and visiting the battlefield of Actium, Athens, Ilium, and other places of historic interest. At Rhodes he met for the first time his coadjutor Piso, who had followed in his wake, and was seeking everywhere to thwart his policy and asperse his character. When at last he reached his destination, he found little difficulty in effecting the settlement of the disturbed provinces, notwithstanding the violent and persistent opposition of Piso. At Artaxata Zeno, the popular candidate for the throne, was crowned king of Armenia; to the provinces of Cappadocia and Com-magena Roman governors were assigned; and Parthia was conciliated by the banishment of the dethroned king Vonones. After wintering in Syria Germanicus started next year for a tour in Egypt. The chief motive for his journey was love of travel and antiquarian study, and it seems never to have occurred to him, till he was warned by Tiberius, that he was thereby transgressing an unwritten law of the empire forbidding any Roman of rank to set foot in Egypt without express permission. On his return to Syria he found that all his arrangements had been upset by Piso. Violent recriminations followed, the result of which, it would seem, was a promise on the part of Piso to quit the province. But at this juncture Germanicus fell ill. Piso deferred his departure, and, when at length compelled to start, lingered in the neighborhood of Syria, receiving with open exultation the bulletins which told of the prince's rapid decline. Germanicus on his side was fully convinced that he had fallen a victim to the arts of his unscrupulous enemy. He knew that he was dying, and believed that he was dying of poison. Even his gentle nature was stung to madness at the thought, and with his dying words he called to his friends and family to denounce his murderer and avenge his death. Whether these suspicions were true must remain an



open question, yet the arguments in favor of a death from natural causes seem to preponderate.

GERMAN SILVER, or NICKEL SILVER, known also under the name of white copper and packfong, is an alloy of copper, nickel, and zinc, prepared either by melting the copper and nickel together in a crucible, and adding piece by piece the previously heated zinc, or by heating the finely divided metals under a layer of charcoal, by means of an air furnace of strong draught, and promoting the thorough solution of the nickel by stirring. To destroy its crystalline structure, and so render it fit for working, it is heated to dull redness, and then allowed to cool. German silver is harder than silver; it resembles that metal in color, but is of a grayer tinge. Exposed to the air it tarnishes slightly yellow, and with vinegar affords a crust of verdigris. At a bright red heat it melts, and with access of the atmosphere loses its zinc by oxidation. At a heat above dull redness it becomes exceedingly brittle. German silver is much used in the arts. For the manufacture of imitation silver for knives and forks its composition is — nickel and zinc of each two parts, and copper four parts; for handles of spoons and forks the proportion of copper in this formula is increased by one. For rolling, the most suitable alloy is copper three parts, zinc one, nickel one. Candlesticks, bells, spurs, and other cast articles are made of a German silver containing 2 or 3 per cent. of lead. The addition of 2 to 2½ per cent. of iron, which must first be melted with part of the copper, makes an alloy which is whiter, but also more brittle and harder, than ordinary German silver.

GERMANY. *Geography and Statistics.* — The German empire occupies the greater portion of central Europe, and has but few lines of natural boundary. If, by the designation Germany, is meant the territory inhabited by Germans, this is considerably larger than the German empire constituted in 1871, the former having an area of about 340,000 and the latter of 208,000 English square miles. The eastern provinces project so far that the extent of the German territory is much greater from southwest to northeast than in any other direction. Tilsit is 815 miles from Metz, whereas Hadersleben, in Schleswig, is only 540 miles from the lake of Constance. The difference in time between the eastern and western points is one hour and eight minutes. The empire is bounded on the southwest and south by Austria and Switzerland (for 1,170 miles), on the southwest by France (275 miles), on the west by Luxembourg, Belgium, and Holland (together 512 miles). The length of German coast on the North Sea or German Ocean, is 300 miles, and on the Baltic 830 miles, the intervening land boundary on the north of Schleswig being only fifty-three miles. The eastern boundary is Russia (725 miles).

The total area of the empire, including rivers and lakes, but not the "haffs" or lagoons on the Baltic, is 208,427 English square miles, which is about the eighteenth part of Europe, the 250th part of the whole dry land, and the 853d part of the whole surface of the globe.

*Physical Features.* — The length of the coast-line is scarcely the third part of the whole frontier, so that the Germans must be regarded as less a maritime than an inland people. Unlike the eastern states of Europe, the German empire has not only an inland sea-shore, but is also in direct communication with the great oceans by means of the North Sea. The coasts of Germany are shallow, and deficient in natural ports, except on the east of Schleswig-Holstein, where wide bays encroach upon the land, giving access to the largest vessels, so that a great harbor for men-of-war

has been constructed at Kiel. With the exception of those on the east coast of Schleswig-Holstein, all the important trading ports of Germany are river ports, such as Emden, Bremen, Hamburg, Lübeck, Stettin, Dantzic, Königsberg, Memel. A great difference, however, is to be remarked between the coasts of the North Sea and those of the Baltic. On the former, where the sea has broken up the ranges of dunes formed in bygone times, and divided them into separate islands, the mainland has to be protected by massive dikes, while the Frisian Islands are being gradually washed away by the waters. On the coast of East Friesland there are now only seven of these islands, of which Norderney, a bathing-place, is best known, while of the North Frisian Islands, on the western coast of Schleswig, Sylt is the most considerable. Besides the ordinary waste of the shores, there have been extensive inundations by the sea within the historic period, the gulf of the Dollart having been so caused in the year 1276. Sands surround the whole coast of the North Sea to such an extent that the entrance to the ports is not practicable without the aid of pilots. Heligoland, which was ceded by England in 1890, is a rocky island, but it also has been considerably reduced by the sea. The tides rise to the height of twelve or thirteen feet in the Jahde Bay and at Bremerhafen, and six or seven feet at Hamburg. The coast of the Baltic on the other hand possesses few islands, the chief being Alsen and Fehmern off the coast of Schleswig-Holstein, and Rügen off Pomerania. It has no extensive sands, though on the whole very flat. The Baltic has no perceptible tides; and a great part of its coast-line is in winter covered with ice, which also so blocks up the harbors that navigation is interrupted for several months every year. Its three haffs fronting the mouths of the large rivers must be regarded as lagoons or extensions of the river beds, not as bays. The Oder Haff is separated from the sea by two islands, so that the river flows out by three mouths, the middle one (Swine) being the most considerable. The Frische Haff is formed by the Nogat, a branch of the Vistula, and by the Pregel, and communicates with the sea by means of the Pillau Tief. The Kurische Haff receives the Memel, called Niemen in Russia, and has its outlet in the extreme north at Memel. Long, narrow alluvial strips, called *Nehrungen*, lie between the last two haffs and the Baltic. The Baltic coast is further marked by large indentations, the Gulf of Lübeck, that of Pomerania, east of Rügen, and the semicircular Bay of Dantzic, between the promontories of Rixhöft and Brästerort. The German coasts are now well provided with lighthouses.

In respect of physical structure Germany is divided into two entirely distinct portions, which bear to one another a ratio of about three to four. The northern and larger part may be described as a uniform plain, covered generally by very recent deposits, but with small areas of Tertiary and Secondary formations protruding here and there. South and Central Germany, on the other hand, is very much diversified in scenery and in geological structure. It possesses large plateaus, such as that of Bavaria, which stretches away from the foot of the Alps, fertile low plains like that intersected by the Rhine, mountain chains, and isolated groups of mountains, comparatively low in height, and so situated as not seriously to interfere with communication either by road or by railway. Its geological structure corresponds to this diversity of surface. The most ancient rocks of Germany are the gneisses, schists, and granites which form the Bohemian and Bavarian plateau, and extend into Saxony. Another isolated mass of similar rocks rising into the heights of the Vosges and Black











Forest has been cut through by the valley of the Rhine. Silurian rocks are but scantily developed in Germany. The Devonian system, however, occupies an extensive area, since it forms the high tableland of the Taunus, Hunsrück, and Eifel, which ranges westward into Belgium. Carboniferous rocks with productive coal-fields cover isolated areas, chiefly in north-western Germany, particularly in Westphalia, at Saarbrück, in Saxony, and in Upper and Lower Silesia (see COAL). Between the Devonian uplands of the Taunus and the crystalline rocks of Bavaria a vast area of western Germany is occupied by the Triassic system, which ranges from Hanover to Basel and from near Metz to Baireuth. The southern half of this vast Triassic basin is bordered by a belt of overlying Jurassic rocks which skirt the Danubian plain in Würtemberg and Bavaria. Cretaceous rocks occur chiefly in north Germany in scattered patches flanking older formations. They evidently underlie the great plain, since they are found rising up here and there to the surface between Westphalia and Denmark. Miocene deposits extend into numerous detached basins, including those of the Rhine below Bonn, and at Mainz, the country round Magdeburg, and the plains of Bavaria. These strata contain valuable seams of lignite. The vast plains of northern Germany are covered with glacial drift, which rises to heights of 1,400 feet above the sea along the edges of the flanking hills. Igneous rocks of different ages have been erupted in many districts, and further diversify the geology. The best known are the Tertiary and post-Tertiary lavas and cones of the Eifel and Siebengebirge; others of more ancient date occur along the southern slopes of the Harz.

Bavaria is the only division of the country that includes within it any part of the Alps, the Austro-Bavarian frontier running along the ridge of the Northern Tyrolean or Bavarian Alps. The Upper German plain sloping northward from the Bavarian Alps is watered by the Lech, the Isar, and the Inn, tributaries of the Danube, all three rising beyond the limits of German territory. This plain is separated on the west from the Swiss plain by the Lake of Constance (Bodensee, 1,306 feet above sea-level), and on the east from the undulating grounds of Austria by the Inn. The average height of the plain may be estimated at about 1,800 feet, the valley of the Danube on its north border being from 1,540 feet (at Ulm) to 920 feet (at Passau). The plain is not very fertile. In the upper part of the plain, toward the Alps, there are several lakes, the largest being the Ammersee, the Würmsee or Starnberg Lake, and the Chiemsee. Many portions of the plain are covered by moors and swamps of large extent; there called *Moose*. The left or northern bank of the Danube, from Regensburg (Ratisbon) downward presents a series of granitic rocks called the Bavarian Forest, which must be regarded as a branch of the Bohemian Forest. The latter is a range of wooded heights on the frontier of Bavaria and Bohemia, occupying the least known and least frequented regions of Germany. The valley of the Danube above Ratisbon is flanked by Jurassic plateaus sloping gently to the Danube, but precipitous toward the valley of the Neckar. The center of this elevated tract is the Rauhe Alp, so named on account of the harshness of the climate. The plateau continuing to the northeast and then to the north, under the name of the Franconian Jura, is crossed by the valley of the winding Altmühl, and extends to the Main. To the west extensive undulating grounds or low plateaus occupy the area between the Main and the Neckar.

The southwestern corner of the empire contains a series of better defined hill-ranges. Beginning with the Schwarzwald (Black Forest), we find its southern heights decline to the valley of the Rhine, above Basel,

and to the Jura. Northward the Black Forest passes into the plateau of the Neckarbergland. The heights between the lower Neckar and the Main form the Odenwald; and the Spessart, which is watered by the Main on three sides, is nothing but a continuation of the Odenwald. West of this range of hills lies the valley of the upper Rhine, extending about one hundred and eighty miles from south to north, and with a width of only twenty to twenty-five miles. In the upper parts the Rhine is rapid, and therefore navigable with difficulty; this explains why the towns there are not along the banks of the river, but some five to ten miles off. But from Speyer (Spires) town succeeds town as far down as Düsseldorf. The western boundary of this valley is formed in the first instance by the Vosges, where granite summits rise from under the surrounding red Triassic rocks. To the south the range is not continuous with the Swiss Jura, the valley of the Rhine being connected here with the Rhone system by low ground known as the Gate of Mülhausen. The crest of the Vosges is pretty high and unbroken, the first convenient pass being near Zabern, which has been taken advantage of for the railway from Strasburg to Paris. On the northern side the Vosges are connected with the Haardt sandstone plateau, which rises abruptly from the plain of the Rhine. The mountains south of Mainz (Mayence), which are mostly covered by vineyards, are lower, the Donnersberg, however, raising its head to 2,262 feet. These hills are bordered on the west by the high plain of Lorraine and the coal-fields of Saarbrücken, the former being traversed by the river Moselle. The larger half of Lorraine belongs to France, but the German part possesses great mineral wealth in its rich layers of ironstone (siderite), and in the coal-fields of the Saar. The Devonian tract of the Hunsrück, Taunus and Eifel is an extended plateau, divided into separate sections by the river valleys. Among these the Rhine valley from Bingen to Bonn, and that of the Moselle from Treves to Coblenz, are winding gorges excavated by the rivers. The Eifel presents a sterile, thinly-peopled plateau, covered by extensive moors in several places. It passes westward imperceptibly into the Ardennes. The hills on the right bank of the Rhine also are in part of a like barren character, without wood; the Westerwald, which separates the valleys of the Sieg and Lahn, is particularly so. The northern and southern limits of the Niederrheinisches Gebirge present a striking contrast to the central region. In the south the declivities of the Taunus are marked by the occurrence of mineral springs, as at Ems on the Lahn, Nauheim, Homburg, Soden, Wiesbaden, etc., and by the vineyards which produce the best Rhine wines. To the north of this Gebirge, on the other hand, lies the great coal basin of Westphalia (the largest in Germany). In the south of the hilly duchy of Hesse rise the isolated mountain groups of the Vogelsberg and the Rhön, separated by the valley of the Fulda, which uniting further north with the Werra forms the Weser. To the east of Hesse lies Thuringia, a province consisting of the far-stretching wooded ridge of the Thüringer Wald, and an extensive elevated plain to the north. Its rivers are the Saale and Unstrut. This plateau is bounded on the north by the Harz, an isolated group of mountains, rich in minerals, with its highest elevation in the bare summit of the Brocken. To the west of the Harz a series of hilly tracts is comprised under the name of the Weser Mountains, out of which above Minden the river Weser bursts by the Porta Westphalica. A narrow ridge, the Teutoburger Wald, extends between the Weser and the Ems as far as the neighborhood of Osnabrück.



To the east the Thüringer Wald is connected by the plateau of the Frankenwald with the Fichtelgebirge. This group of mountains, occupying what might be regarded as ethnologically the center of Germany, forms a hydrographical center, whence the Nab flows southward to the Danube, the Main westward to the Rhine, the Eger eastward to the Elbe, and the Saale northward, also into the Elbe. In the northeast the Fichtelgebirge connects itself directly with the Erzgebirge, which forms the northern boundary of Bohemia. The southern sides of this range are comparatively steep; on the north it slopes gently down to the plains of Leipsic, but is intersected by the deep valleys of the Elster and Mulde. Although by no means fertile, the Erzgebirge is very thickly peopled, as various branches of industry have taken root there in numerous small places. Around Zwickau there is a productive coal-field, and mining for metals is carried on near Freiberg. In the east a tableland of sandstone, called Saxon Switzerland, from the picturesque outlines into which it has been eroded, adjoins the Erzgebirge; one of its most notable features is the deep ravine by which the Elbe escapes from it. Numerous quarries, which supply the North German cities with stone for buildings and monuments, have been opened along the valley. The sandstone range of the Elbe unites in the east with the low Lusatian group, along the east of which runs the best road from northern Germany to Bohemia. Then comes a range of lesser hills, clustering together to form the frontier between Silesia and Bohemia. The most western group is the Isergebirge, and the next the Riesengebirge, a narrow ridge of about twenty miles' length, with bare summits. Excluding the Alps, the Schneekoppe (5,266 feet) is the highest peak in Germany; and the southern declivities of this range contain the sources of the Elbe. The hills north and northeast of it are termed the Silesian Mountains. Here one of the minor coal-fields gives employment to a population grouped round a number of comparatively small centers. One of the main roads into Bohemia (the pass of Landshut) runs along the eastern base of the Riesengebirge. Still farther to the east the mountains are grouped around the hollow of Glatz, whence the Neisse forces its way toward the north. This hollow is shut in on the east by the Sudetic group, in which the Altvater rises to almost 4,900 feet. The eastern portion of the group, called the Gesenke, slopes gently away to the valley of the Oder, which affords an open route for the international traffic, like that through the Mülhausen Gate in Alsace. Geographers style this the Moravian Gate.

The North-German plain presents little variety, yet is not absolutely uniform. A row of low hills runs generally parallel to the mountain ranges already noticed, at a distance of twenty to thirty miles to the north. Westward lies, as the last link of this series, the Lüneburger Haide or Heath, between the Weser and Elbe, north of Hanover. A second tract, of moderate elevation, sweeps round the Baltic, without, however, approaching its shores. This plateau contains a considerable number of lakes, and is divided into three portions by the Vistula and the Oder. The finely wooded heights which surround the bays of the east coast of Holstein and Schleswig may be regarded as a continuation of the Baltic elevations. The lowest parts, therefore, of the North-German plain, excluding the sea-coasts, are the central districts from about 52° to 53° N. latitude, where the Vistula, Netze, Warthe, Oder, Spree, and Havel form vast swampy lowlands, which, during the last hundred years, have been considerably reduced by the construction of canals and by cultivation—improvements due in large measure to Frederick the Great. The Spreewald, to the southeast

of Berlin, is one of the most remarkable districts of Germany. As the Spree divides itself there into innumerable branches, inclosing thickly wooded islands, boats form the only means of communication. West of Berlin the Havel widens into what are called the Havel lakes, to which the environs of Potsdam owe their charms. In general the soil of the North-German plain cannot be termed fertile, the cultivation nearly everywhere requiring severe and constant labor. Long stretches of ground are covered by moors, and there turf-cutting forms the principal occupation of the inhabitants. The greatest extent of moorland is found in the westernmost parts of the plain, in Oldenburg and East Frisia. The plain contains, however, a few districts of the utmost fertility, particularly the tracts on the central Elbe, and the marsh lands on the west coast of Holstein and the north coast of Hanover, Oldenburg, and East Frisia, which, within the last two centuries, the inhabitants have reclaimed from the sea by means of immense dikes.

Nine independent river-systems may be distinguished; those of the Memel, Pregel, Vistula (Weichsel), Oder, Elbe, Weser, Ems, Rhine, and Danube. Of these the Pregel, Weser, and Ems belong entirely, and the Oder mostly, to the German empire. The Danube has its sources in German soil; but only the fifth part of its course is German. Its total length is 1,730 miles, and the Bavarian frontier at Passau, where the Inn joins it, is only 350 miles distant from its sources. It is navigable as far as Ulm, 220 miles above Passau; and its tributaries the Lech, Isar, Inn, and Altmühl are also navigable. The Rhine is the most important river in Germany, although neither its sources nor its mouths are within the limits of the empire. From the Lake of Constance to Basel (122 miles) the Rhine forms the boundary between the German empire and Switzerland; the canton of Schaffhausen, however, is situated on the northern bank of the river. From Basel to below Emmerich the Rhine belongs to the German empire—about 470 miles, or fourth-sevenths of its whole course. It is navigable all this distance, as are also the Neckar from Esslingen, the Main from Bamberg, the Lahn, the Lippe, the Ruhr, the Moselle from Metz, with its affluents the Saar and Saucr. Vessels sail up the Ems as far as Papenburg, and river craft as far as Greven, and the river is connected with a widely branching system of canals for turfboats. The Fulda, navigable for sixty-three miles, and the Werra thirty-eight miles, above the point where they unite, form by their junction the Weser, which has a course of 271 miles, and receives as navigable tributaries the Aller, the Leine from Hanover, and some smaller streams. Large steamers cannot, however, get as far as Bremen, and that commercial emporium has in consequence been obliged to form a seaport at Bremerhaven. The Elbe, after a course of 250 miles, enters German territory near Aussig, 482 miles from its mouth. It is navigable above this point to its junction with the Moldau. Hamburg may be reached by vessels of ten to eleven feet draught. The navigable tributaries of the Elbe are the Saale (below Naumburg), the Havel, Spree, Elde, Sude, and some others. The Oder begins to be navigable almost on the frontier at Ratibor, 480 miles from its mouth, receiving as navigable tributaries the Glatz Neisse and the Warthe. Only the lower course of the Vistula belongs to the German empire, within which it is a broad, navigable stream of considerable volume. On the Pregel ships of 2,500 tons reach Königsberg, and river barges reach Insterburg; the Alle, its tributary, may also be navigated. The Memel is navigable in its course of 113 miles from the Russian frontier. Germany is thus a country abounding in natural waterways,



the total length of them being estimated at 7,000 miles. But it is only the Rhine, in its middle course, that has at all times sufficient volume of water to meet the requirements of a good navigable river.

The regions which abound in lakes have already been pointed out. The Bodensee or Lake of Constance (186 square miles) is on the frontier of the empire—portions of the northern banks belonging severally to Bavaria, Würtemberg, and Baden. The largest lake entirely on German territory is the Chiemsee (seventy-five square miles); the Ammersee and the Würmsee are, however, but little less. A good many smaller lakes are to be found in the Bavarian Alps. The North-German plain is dotted with upward of 500 lakes, covering an area of about 2,500 square miles. The largest of these are the three Haffs—the Oderhaff covering 370 square miles, the Frische Haff 332, and the Kurische Haff 626. The lakes in the Prussian and Pomeranian provinces, in Mecklenburg, and in Holstein, and those of the Havel, have already been mentioned. In the west the only lakes of importance are the Steinhuder Meer, fourteen miles northwest of Hanover, and the Dümmersee on the southern frontier of Oldenburg.

The climate of Germany is to be regarded as intermediate between the oceanic and continental climates of western and eastern Europe respectively. It has nothing in common with the Mediterranean climate of southern Europe, Germany being separated from that region by the lofty barrier of the Alps. Although there are very considerable differences in the range of temperature and the amount of rainfall throughout Germany, these are not so great as they would be were it not that the elevated plateaus and mountain chains are in the south, while the north is occupied by low-lying plains.

The flora of Germany comprises about 3000 species of phanerogamic and about 4000 cryptogamic plants. The country does not, however, form a single natural region, and cannot be characterized distinctively by any of the principal botanical types.

The woodlands form about one-fourth of the entire soil, the proportion of forest being far greater than in any other state in the west or south of Europe; the percentage for France is but seventeen, for Italy twelve, for Great Britain about three. The state forests alone occupy 17,600 square miles; and the greatest attention is paid throughout the empire to forest culture. Speaking generally, northern is not nearly so well wooded as central and southern Germany, where indeed most of the smaller mountains are covered with timber, as is indicated by the frequent use of the termination of *wald* affixed to the names of the mountain ranges (as Schwarzwald, Thüringer Wald, etc.) A narrow strip along the shores of the Baltic is covered with oaks and beeches; further inland coniferous trees are the most prevalent, particularly the Scotch fir; birches are also abundant. The mountain forests consist chiefly of firs, pines and larches, but contain also silver firs, beeches, and oaks. Chestnuts appear on the terraces of the Rhine valley, and in Swabia and Franconia. The whole northwest of Germany is destitute of wood, but to compensate for this the people have ample supplies of fuel in the extensive stretches of turf.

The same kinds of cereal crops are cultivated in all parts of the empire, but in the south and west wheat is predominant, and in the north and east rye, oats, and barley. To these in some districts are added spelt, buckwheat, millet, rice-wheat, lesser spelt, and maize. In general the soil is remarkably well cultivated. The three years' rotation formerly in use, where autumn and spring-sown grain and fallow succeeded each other, has now been abandoned, except in some districts, where the system has been modified and improved. In South

Germany the so-called *Fruchtwechsel* is practiced, the fields being sown with grain crops every second year, and with peas or beans, grasses, potatoes, turnips, etc., in the intermediate years. In North Germany the mixed *Koppelwirtschaft* is extending, by which system, after several years of grain crops, the ground is for two or three seasons in pasture. No general statistics on the subject of crops have as yet been published, but, according to private estimate, a fair average season will yield 325 million quarters of rye, oats 300, wheat and spelt 170, barley 100. In good seasons the production has been found sufficient to meet the native demand. Formerly the exports of the produce of the wheat and pulse crops exceeded the imports, but the importation of cereals has now for a number of years been constantly increasing. The potato is largely cultivated, not merely for food, but for distillation into spirits. This manufacture is prosecuted especially in eastern Germany. The Prussian provinces east of the Elbe, including Mecklenburg and Saxony, with a population of about nineteen millions, produced seventy-two million gallons of spirits in 1876, while the rest of Germany (population twenty-four millions) produced only twenty-five million gallons. The common beet is largely grown in some districts for the production of sugar, which has greatly increased during the last thirty years. There are two centers of the beet-root sugar production; 231 factories, or more than two-thirds of the whole, are in Prussian Saxony, Hanover, Brunswick, Anhalt, and Thuringia, and there are seventy-one in Silesia, Brandenburg, and Pomerania, the principal center of the latter group being Frankfort-on-the-Oder. Flax and hemp are cultivated, though not so much as formerly, for manufacture into linen and canvas, and also for the production of oil. The home supply no longer suffices for the native demand. The cultivation of hops is in a very thriving condition in the southern states of Germany. The soil occupied by hops was estimated in 1873 at 93,680 acres,—a larger area than in any other country of the globe (Great Britain having about 70,000 acres). The total production of hops is 477,000 cwts., and of this 402,000 cwts. are grown in Bavaria, Würtemberg, Baden, and Alsace-Lorraine. Hops thus form one of the standard articles of exportation from Germany, as well as beer. The following table shows the number of breweries in different parts of the country, and the amount of their production:

| STATES.                     | Breweries. | Total.      | Per Head. |
|-----------------------------|------------|-------------|-----------|
|                             |            | Gallons.    | Gallons.  |
| Northern Germany.....       | 12,186     | 448,000,000 | 14        |
| Bavaria, not including {    | 6,703      | 269,000,000 | 59        |
| Palatinate.....             |            |             |           |
| Palatinate (estimated)..... | .....      | 13,000,000  | 20        |
| Würtemberg.....             | 7,777      | 85,300,000  | 46        |
| Baden (estimated).....      | 1,500      | 24,200,000  | 18        |
| Alsace-Lorraine.....        | 241        | 17,600,000  | 11        |
| Total, about.....           | 28,500     | 857,100,000 | 20        |

Tobacco forms the most productive and most profitable object of culture in many districts. The total extent under this crop in 1876 was 53,720 acres, no less than 32 per cent. of this being in Baden, 22 in Bavaria, 16 in Alsace-Lorraine, and only 30 per cent. in the rest of Germany. In the north, the plant is cultivated principally in Pomerania, Brandenburg, and East and West Prussia. Of late years the production has on the whole diminished, the average amount having been 800,000 cwts. from 1872 to 1876.

The culture of the vine is almost confined to Southern and Western Germany, and especially to the Rhine dis-



tract. In the valley of the Saale and Elbe (near Dresden), and in Lower Silesia (between Guben and Grünberg), the number of vineyards is small, and the wines of inferior quality; but along the Rhine from Basel to Coblenz, in Alsace, Baden, the Palatinate, and Hesse, and above all in the province of Nassau, the lower slopes of the hills are literally covered with vines. Here are produced the celebrated Rüdesheimer, Hochheimer, and Johannisberger. The vines of the lower Main, particularly those of Würzburg, are the best kinds; those of the upper Main and the valley of the Neckar are rather inferior. The Moselle wines are lighter and more acid than those of the Rhine. The total amount produced in Germany is estimated at 1000 million gallons,—Alsace-Lorraine turning out 400 millions, Baden 175, Bavaria, Würtemberg and Hesse together, 300, while the remainder, which, though small in quantity, is in quality the best, is produced by Prussia.

*Live Stock.*—The cultivation of grazing lands in Germany has been greatly improved in recent times, and is in a highly prosperous condition. The provinces of Pomerania and Hanover are particularly remarkable in this respect. The best meadow lands of Bavaria are in the outer range of the Alps, those of Saxony in the Erzgebirge.

The breeding of domestic animals is prosecuted most extensively in Bavaria, and in the maritime provinces. There we find 1,000 to 1,500 head of the larger kinds (horses, cattle, sheep, goats, swine) for every 1,000 inhabitants; in the rest of Eastern Germany 600 to 800; and in Central and Southern Germany only 400 to 600; In the number of horses Germany ranks with Great Britain (about eighty for every 1,000 inhabitants); and, although the production cannot satisfy the home demand, the imports being nearly 30,000 in excess of the exports annually, the breeding of horses has attained great perfection. The main center is in East and West Prussia, where there are more than half a million of horses—about thirty per English square mile; then follow the marsh districts on the Elbe and Weser, some parts of Westphalia, Saxony, and Upper Silesia, Lower Bavaria, Lower Alsace, and Lorraine. Cattle abound in most South-German states, especially Bavaria and Würtemberg, where there are 180 to 200 head for every square mile. In the northern and northeastern districts, on the other hand, the numbers are small (in some districts only thirty to fifty head to the square mile), except Schleswig-Holstein and the marsh lands along the shores of the North Sea, whence there is a considerable exportation to England. The aggregate number of sheep in Germany is only exceeded in Europe by that in Great Britain and Russia. The principal sheep districts are Pomerania and Mecklenburg (300 per square mile). As a rule, sheep-farming is resorted to where the soil is of inferior quality and unsuitable for tillage and the breeding of cattle. Far more attention is accordingly given to the rearing of sheep in Northern and Northeastern Germany than in Schleswig-Holstein, East Frisia, Westphalia, Rhineland, and South Germany. At the same time the native demand for wool is not covered by the home production. The largest stock of swine is in Central Germany and Saxony, in Westphalia, on the lower Rhine, in Lorraine, Hesse, etc. Central Germany (especially Gotha and Brunswick) exports sausages and hams largely, as well as Westphalia; but the excess of swine imported over the exports for the whole of Germany ranges from 600,000 to 800,000 annually.

The number of wild animals in Germany is not very great. Foxes, martens, weasels, badgers, and others are to be found everywhere; wolves are rare, but they find their way sometimes from French territory to the western provinces, or from Poland to Prussia and

Posen. Among the rodents the hamster and the field-mouse are a scourge to agriculture. Of game there are the roe, stag, boar, and hare; the fallow deer and the wild rabbit are less common. The elk is to be found in the forests of East Prussia. The feathered tribes are everywhere abundant in the fields, woods, and marshes. Wild geese and ducks, grouse, partridges, snipes, woodcocks, quails, widgeons, and teal are plentiful all over the country. Geese and ducks are found mostly in the flat districts, where the great abundance of standing water affords ample scope for their increase. Tame geese are bred in large flocks, particularly in Pomerania.

The waters of Germany abound with fish; but the genera and species are few. Carp and salmon tribes are the most abundant; after them rank the pike, the eel, the shad, the roach, the perch, and the lamprey. In addition to frogs, Germany has few varieties of Amphibia. Of serpents there are only two kinds, one of them being poisonous.

The rearing of bees is particularly attended to in the healthy districts of Hanover. The number of beehives may be estimated at 2,000,000, and the produce of wax and honey at 100,000 cwts. The cultivation of silk-worms has been attempted, but has either entirely failed or had very indifferent success. In 1852–62 an attempt was made to extend the cultivation of the mulberry in the province of Brandenburg; but disease among the silk-worms, which it was found impossible to repress, rendered it unsuccessful.

*Minerals.*—Germany abounds in useful minerals, and in consequence takes a high place among industrial states. The production falls short, indeed, of that of England, but bears comparison with that of France and of the United States.

There are six large coal fields, occupying an area of about 3,600 square miles, of which the most important occupies the basin of the Ruhr, its extent being estimated at 2,800 square miles. Here there are more than sixty beds, of a total thickness of 150 to 200 feet of coal; and the amount in the pits has been estimated at 45,000 millions of tons, so that the basin, at the present rate of 17,500,000 tons raised per annum, would not be exhausted in 2,000 years. Smaller fields are found near Osnabrück, Ibbenbüren and Minden, and a larger one near Aix-la-Chapelle. The Saar coal-fields, within the area inclosed by the rivers Saar, Nahe and Blies (460 square miles), is one of great importance. The thickness of eighty beds amounts to 250 feet, and Von Dechen estimates the total mass of coal at 45,400,000,000 tons. The greater part of the basin belongs to Prussia, the rest to Lorraine. A still larger field exists in the Upper Silesian basin, on the borderland between Austria and Poland, containing about 50,000,000,000 tons. Beuthen is the chief center. The Silesian coal-fields have a second center in Waldenburg, east of the Riesengebirge. The Saxon coal-fields stretch eastward for some miles from Zwickau. Deposits of less consequence are found in Upper Bavaria, Upper Franconia, Baden, in the Hartz, etc.

Germany abounds in iron ores, some of which are of superior quality. The production increased rapidly for a time, but in recent years there has been a very great decline.

Germany possesses abundant salt deposits. The actual production not only covers the home consumption, but also allows a yearly increasing exportation, especially to Russia, Austria and Scandinavia.

*Shipping.*—The German merchant marine has always been distinguished by the excellence of its personnel. The seamen of Frisia are acknowledged to be among the best in the world, and the shipping of Bremen and Hamburg had won an everywhere re-



spected name long before a German merchant marine, properly so called, was heard of. In 1887 the mercantile navy comprised 694 steamers, of 453,914 tons, and 3,327 sailing vessels, of 830,789 tons, making a total of 4,021 vessels, of 1,284,703 tons. Of these 2,518 vessels, of 412,417 tons, belonged to Prussian ports. The total number of sailors employed in the merchant service in 1887 was 39,021. The movement of shipping at all German ports in 1886 was as follows:

| Vessels. | With<br>Cargoes. | Tonnage   | In Bal-<br>last. | Tonnage.  | Total<br>No. | Total<br>Tonnage. |
|----------|------------------|-----------|------------------|-----------|--------------|-------------------|
| Entered  | 49,819           | 9,423,304 | 9,485            | 869,109   | 59,304       | 10,292,413        |
| Cleared  | 44,791           | 7,683,540 | 14,445           | 2,655,881 | 59,236       | 10,339,421        |

Of the total tonnage entered and cleared, 10,263,013 tons were under the German, and 5,751,954 tons under the British flag.

*Telegraph and Postal Service.*—By combining the postal and telegraphic departments Germany has been saved a large number of officials; but great sums are still expended annually on the extension of the telegraph system. At the end of 1886 the length of telegraph lines in the empire was 53,874 miles, having 191,272 miles of wire. The number of messages during the year was 20,510,294, of which 14,568,346 were internal. With the exception of Bavaria and Württemberg, which have administrations of their own, all the German states belong to the system of the reichspost. Germany, including the above named two kingdoms, constitutes with Austria-Hungary a special postal union, besides forming part of the international postal union. The receipts of the postoffice during 1886-'87 amounted to 220,346,932 marks, and the expenditure to 175,076,000 marks. There were 186,888 postoffices, employing 97,863 persons at the end of 1886. During the year there were transmitted 858,587,550 letters, 261,056,660 post-cards, 20,187,170 patterns, 245,618,370 stamped wrappers, 578,611,143 journals, and 180,492,148 registered packets and money-orders of the total declared value of 18,116,304,652 marks.

The German empire is a union of twenty-five sovereign states—four kingdoms, six grand-duchies, five duchies, seven principalities, three free towns. Alsace-Lorraine, ceded by France at the peace concluded May 10, 1871, forms a twenty-sixth constituent of the confederation, but it is administered by the central authority. The supreme direction of the military and political affairs of the empire has, by the vote of the reichstag or diet of the North German confederation, been vested in the king of Prussia, who accordingly bears the title of German Emperor.

The imperial dignity is hereditary in the line of Hohenzollern, and follows the law of primogeniture. The emperor exercises the imperial power in the name of the confederated states. In his office he is assisted by a federal council or bundesrath, which represents the governments of the individual states of Germany. The members of this council, fifty-nine in number, are appointed for each session by the governments of the individual states. The legislative functions of the empire are vested in the emperor, the bundesrath, and the reichstag or diet. The members of the latter, 397 in number, are elected for a space of three years by universal suffrage. Vote is by ballot, and one member is elected by (approximately) every 100,000 inhabitants.

As regards its legislative functions, the empire has supreme and independent control in matters relating to military affairs and the navy, to the imperial finances, to German commerce, to posts and telegraphs, and also to railways, in so far as these affect the common defense

of the country. Bavaria and Württemberg, however, have preserved their own postal and telegraphic administration. The legislative power of the empire also takes precedence of that of the separate states in the regulation of matters affecting freedom of migration, domicile, settlement, and the rights of German subjects generally, as well as in all that relates to banking, patents, protection of copyright claims, navigation of rivers and canals, civil and criminal legislation, judicial procedure, sanitary police, and control of the press and of associations.

The executive power is in the emperor's hands. He represents the empire internationally, and can declare war if defensive, and make peace as well as enter into treaties with other nations; he also appoints and receives ambassadors. For declaring offensive war the consent of the federal council must be obtained. The separate states have the privilege of sending ambassadors to the other courts; but all consuls abroad are officials of the empire, and are named by the emperor.

Both the federal council and the reichstag meet in annual sessions convoked by the emperor, who has the right of proroguing and dissolving the diet; but the prorogation must not exceed sixty days, and in case of dissolution new elections must be ordered within sixty days, and the new session open within ninety days. All laws for the regulation of the empire must, in order to pass, receive the votes of an absolute majority of the federal council and the reichstag.

The federal council is presided over by the chancellor of the empire (Reichskanzler). Imperial measures, after passing the federal council and the reichstag, must obtain the sanction of the emperor in order to become law, and must be countersigned, when promulgated, by the chancellor of the empire. All members of the federal council are entitled to be present at the deliberations of the reichstag. The federal council, acting under the direction of the chancellor of the empire, is also a supreme administrative and consultative board, and as such it has nine standing committees, viz. —for army and fortresses; for naval purposes; for tariffs, excise and taxes; for trade and commerce; for railways, posts and telegraphs; for civil and criminal law; for financial accounts; for foreign affairs; and for Alsace-Lorraine. Each committee includes representatives of at least four states of the empire.

For the several branches of administration a considerable number of imperial offices have been gradually created. All of them, however, either are under the immediate authority of the chancellor of the empire, or are separately managed under his responsibility. The most important are the chancery office, the foreign office, and the general post and telegraph office. But the heads of these do not form a cabinet.

By the electoral law of May 31, 1869, every German of twenty-one years of age is entitled to be an elector, and every one who has completed his twenty-fifth year, and has resided for a year in one of the federal states, is eligible for election. The deputies are unsalaried, but during the session they have the right of traveling free by rail.

All the German states are constitutional, except Alsace-Lorraine and the two grand-duchies of Mecklenburg. The six larger states have adopted the two-chamber system, but in the composition of the houses great differences are found. As regards the lower house, 60,000 inhabitants elect one deputy in Prussia, 33,000 in Bavaria, 35,000 in Saxony, 20,000 in Württemberg, 24,000 in Baden, 18,000 in Hesse.

*Railroads.*—The period of railroad construction was inaugurated in Germany by the opening of the line from Nuremberg to Fürth in 1835, but the development of



the system was slow. Until 1866 there was no railroad from Bremen in the interior of Germany, while now there are four. Prior to 1865 the construction of railroads advanced pretty uniformly. Germany was at that time far outstripped in the extent of its railroad system by England, Belgium and Switzerland, and even by France. A new period of railroad construction began with the year 1866, and is closely connected with the economical and political progress of Germany. Numerous great undertakings were then set on foot partly to remedy the defects of the existing system. Everywhere it became a primary object to establish the most direct lines of communication between important places of industry and commerce. As a consequence, the German railroad system was immensely enlarged, and from 1865-75 it was nearly doubled. On December 31, 1877, Germany had 18,830 miles; Great Britain and Ireland, 17,092; France, 14,785. The total length of the railroads open to traffic in 1887 was 24,197 miles, of which 21,112 miles belonged to the state. The government is rapidly acquiring all the remaining lines now owned and operated by private companies. The total amount expended in the construction of German railroads to the end of 1886 was 9,472,606,000 marks. The receipts for 1886 were 998,693,000 marks, and the expenses 574,975,000 marks; showing a net profit of 4.42 per cent. on the capital.

*Area and Population.*—The area of Germany is 208,863 square miles, and its population, December 1, 1885, was 46,855,704, of whom 22,933,664 were males, and 23,922,040 females. The average density of the population was 221 per square mile. The bulk of the population is Teutonic, but there were 3,205,000 non-Germanic inhabitants, including 2,454,000 Slavs; 2,800,000 Walloons and French; 150,000 Lithuanians; 140,000 Danes, and 140,000 Wends, Moravians and Bohemians. In 1886, 76,687 persons emigrated from the German Empire by way of German ports and Antwerp, 41,898 of whom were males, and 34,789 females; there were 10,609 families, comprising 38,950 persons.

The United States received 72,403; Brazil, 2,045; British North America, 330; other American countries, 1,068; Africa, 191; Asia, 116; and Australia, 534. In addition to the above total, 3,188 Germans left the empire by way of Rotterdam, Amsterdam and Havre, in 1886. The number of emigrants from the empire, in 1887, was 99,712. On December 1, 1886, there were 372,792 foreigners in Germany.

*Commerce and Industry.*—The total export trade of the empire in 1887 was valued at 3,269,900,675 marks, against 3,127,655,275 marks in 1886.

The imports amounted to 3,268,517,950 marks in 1887, and to 3,018,475,350 in 1886.

Protective duties on grain and cattle were imposed in 1879, which had the effect of increasing the receipts of the treasury from the duties on cereals from 14,300,000 to 30,600,000 marks, and from the cattle duties from 1,021,500 to 4,590,750 marks. Nevertheless, they had failed to protect German agriculture from the competition of foreign countries where production is much cheaper. The duties were raised in 1885 still higher, but without producing the desired effect. Wheat, instead of rising, fell to a price unknown for a century. The Central Council of Agriculture, therefore, called for a further measure to preserve the agricultural interests of Germany, both large and small, from the ruin with which they were menaced. The government proposed to double the existing duties, but the Reichstag, in the measure that was finally passed, slightly reduced this proposal. The new tariff fixes the duty on wheat and rye at about 40 cents a bushel; on oats and malt, 31

cents; on barley, 18 cents; on buckwheat, legumes and Indian corn, 16 cents. Farinaceous preparations pay duties from 30 to 50 per cent. higher than formerly.

In 1886-87, there was under cultivation a total area of 64,989,560 acres. The leading agricultural products were, wheat, 2,933,065 tons, produced from 4,791,583 acres; rye, 6,702,134 tons, from 14,596,255 acres; barley, 2,570,921 tons, from 4,328,600 acres; oats, 5,341,483 tons, from 9,615,337 acres; potatoes, 27,657,340 tons, from 7,289,367 acres; clover, hay, etc., 28,242,253 tons, from 21,367,500 acres; wines, 33,066,594 gallons, from 300,752 acres; tobacco, 81,166,000 pounds, from 49,000 acres. The product of raw and refined sugar was, 1,418,900 tons. The total value of the mineral products in 1886 was 463,000,000 marks. The value of coal raised was 300,727,000 marks; lignite, 40,270,000 marks; iron ore, 29,642,000 marks; zinc ore, 7,722,000 marks; lead ore, 15,919,000 marks; copper ore, 14,415,000 marks; silver and gold, 3,977,000 marks; mineral salts, 13,427,000 marks; other salts, 35,024,000 marks. In 1886 the value of the pig-iron produced in Germany was 140,383,000 marks—229 furnaces being in operation. The finished iron was valued at 418,727,000 marks, and the total value of the production of foundries of all kinds was 690,000,000 marks. In the manufacture of iron 200,000 men were employed.

*German Colonies.*—Germany had no dependencies beyond the seas before 1884. Since that time she has established protectorates over extensive regions in Africa and many islands in the Pacific Ocean. In 1884, Pogoland, on the slave coast of West Africa, with Porto Seguso and Little Popo, in all about 400 square miles, with 40,000 inhabitants and a trade of \$1,200,000 a year, were annexed, and in the same year the German flag was raised over the Cameroon region, extending for 300 miles along the coast, from Rio del Rey on the north to the River Campo on the south, and in the interior to 150° of east longitude, comprising 120,000 square miles. Damaraland and Namaqualand, in South Africa, were taken under German protection between 1884 and 1886, embracing a territory of 230,000 square miles, with 200,000 native inhabitants.

In East Africa the territory acquired by the German East African Society in Usagora and the neighboring districts, comprising 20,700 square miles, was made a German protectorate in 1885 by the *Schutzbrief*, a protecting charter by the emperor. In the same year Wituland, 5,200 square miles, was added, and in 1886, by virtue of an agreement with Great Britain and Zanzibar, the German Government established a protectorate over 122,800 square miles of territory in East Africa. The German acquisitions extend from Kilimanjaro mountain on the north to the River Rovuma in the south. The total area in Africa that has been brought under German domination is about 740,000 square miles, not including 200,000 square miles in East Africa, over which German traders claim to have secured territorial rights, comprising the districts of Khutu, Usambara, Para, Ugono, Arusha, Djagga, Usavamo, Ulena, Wamatshonde, Mahenge, Magindo, Girijania, Sabaki, the Galla country, and Ukamba Gasi. The districts that were included in the protectorate before 1888 are Usagara, Ukami, Nguru, and Usega. In accordance with a treaty made with the sultan of Zanzibar on April 28, 1888, the German East Africa Company has acquired a fifty years' lease of the entire strip of coast, with rights to all duties and tolls, whereas previously the possessions of the company were cut off from the sea, and it had only a concurrent right to use the two harbors of Dar-es-Salam and Pangani. The region south of Tana is inhabited by the



peaceful Suaheli tribes, while north of that river, in the Galla country, and on the Somali coast, dwell the warlike and predatory Galla and Somali tribes. The little sultanate of Witu, which lies immediately north of Tama, is administered by a company connected with the German Colonial Association. The territory that came under German dominion by arrangement with Great Britain is bounded by a line passing from Witu to Fungasombo and Mknumbi, and then running to the ocean, which it strikes at a point between the mouth of Mknumbi and Osi rivers. The boundary on the other side ascends the Osi as far as Kau, and then the river Magogoni to its source, whence it follows a straight line to Witu. The soil is well watered and fruitful, and on the coast are several good harbors. The Germans expect to find a rich field of commerce in Somaliland. The country produces gum-arabic, frankincense, myrrh, and other aromatic resins and herbs, coffee of the finest quality, honey and wax, ostrich feathers, ivory, dye woods, pharmaceutical plants, cloves, cocoanuts, sesame, earth nuts, palm oil, and gum copal, and on the plateau that forms the interior the Bedouins and Somali tribes raise herds of camels that they count by thousands, as well as sheep and goats, cattle and asses, in vast numbers, and all ride Arab horses of purest race. There is now a large export of cattle, hides and butter. In the Suaheli country the Germans have experimented in the cultivation of cotton, tobacco, sugar, vanilla, pepper, nutmeg and indigo. The results proved very fair. The German East African Plantation Society has 62,000 acres planted, and has adopted a system of modified slavery, contracting with Indian traders, who furnish gangs of 150 negroes for terms of two years, the contractors feeding, housing and overseeing the laborers.

The northern part of southeastern New Guinea, lying between Humboldt Bay and Huon Gulf, with an area of 70,300 square miles and an estimated population of 109,000 souls, was made a German possession during 1885 and 1886, and given the name of Kaiser Wilhelm's Land. New Britain and other islands lying between  $141^{\circ}$  and  $154^{\circ}$  of east longitude and between  $8^{\circ}$  of south latitude and the equator, having a land surface of 18,150 square miles and 188,000 inhabitants, were annexed in 1885 and called Bismarck Archipelago. In 1886 were added the islands of Bougainville, Choiseul, Isabel, and others in the northern part of the Solomon group, with an area of 8,500 square miles and a population of 80,000 persons. The Marshall islands, having an area of forty-two square miles and about 10,000 inhabitants, were included in the acquisitions of 1885. The Providence and Cron groups have also become German territory. Kaiser Wilhelm's Land is the field of operations for a trading and colonization society called the New Guinea Company, which has stations on the coast of Finch-Haven and Constantine and Hatzfeld harbors. The islands of the Bismarck Archipelago produce copral, or dried cocoanut, of which 1,500 tons were exported in 1885, mother of pearl and trepang. In New Guinea there have been several collisions with the natives, who have no rifles, but use the bow and the spear with great dexterity.

*Army.*—By the constitution of April 16, 1871, every German is liable to service, and no substitution is allowed. Every German capable of bearing arms has to serve in the standing army for seven years—as a rule, from the end of the twentieth till the commencement of the twenty-eighth year of his age. Three of these years he must spend in the active service, and the remainder in the reserve; after getting the latter he forms part of the landwehr for five years more—the full time of military service thus being twelve years.

The peace strength of the German army in 1887-88 was 18,936 officers, 471,007 rank and file, 90,492 horses and 1,374 guns. The new army law of March 11th renewed the septenate, which is to continue till March 31, 1894, and added 50,000 soldiers to the regular military establishment, fixing the peace strength of the army at 468,409 rank and file, and 23,991 officers, surgeons, paymasters, etc. The war strength of the army is 1,567,600 officers and men, 312,730 horses, and 2,958 guns. To these numbers may be added the landsturm, and one-year volunteers, together numbering 1,082,400 officers and men, and the untrained men capable of serving in the army numbering 3,020,000, making the total available force in time of war 5,670,000 officers and men. The railway and telegraph service in time of war numbers 1,238 officers, 7,000 men, and 5,400 horses.

The Prussian contingent of the German army had a peace strength, in 1887-88, of 361,902 officers and men.

The empire is divided into nine fortress districts, in which there are seventeen fortified places of the first class and twenty-six other fortresses.

The German infantry wear lighter helmets than formerly, and their new magazine rifles are fitted with small knife-like bayonets. The cuirassiers have laid aside their cuirass, and are now armed with the lance, like the uhlans, and the same weapon is being adopted for the hussars.

General Field-Marshal Count von Moltke, chief of the general staff of the German army since September 18, 1858, resigned his position on August 3, 1888, on account of old age, and Emperor William II. appointed as his successor General Count von Waldersee, who was born in 1832, first served on the general staff in 1866, was made a colonel for his services in the Franco-Prussian war, and was appointed quartermaster-general in 1882, in connection with which post he had acted as deputy chief of the general staff and aide-de-camp general to the emperor.

*Navy.*—The German navy is of but recent origin. In 1848 the German people urged the construction of a fleet. Money was collected, and a few men of war fitted out, but these were subsequently sold, the German bundestag (federal council) not being in sympathy with the nation. Prussia, however, began to lay the foundation of a small navy. In 1864 Prussia, by annexing Holstein, obtained possession of the excellent port at Kiel, which has since been strongly fortified. From the time of the formation of the North German confederation, the navy has belonged to the common federal interest. Since 1868 it consisted of eighty-nine vessels of five hundred and sixty-three guns. Since then a definite plan for the further development of the navy has been set on foot, and great activity has been displayed in fitting out ships and in augmenting its personnel.

In 1887 the naval forces of the empire consisted of one hundred and five vessels, of an aggregate displacement of 201,521 tons, mounting six hundred and five guns. The iron-clad navy comprises eight frigates, five corvettes, and fourteen gun-boats, eleven of which are built on the same model and armed each with a single thirty-six-ton gun. The number of first and second class torpedo boats that were completed was one hundred and ten, and others were building. The larger vessels in course of construction on January 1, 1888, were two frigate cruisers of 4,800 tons, three corvettes, a transport, and two dispatch-boats, one of which was completed in July. The personnel of the navy on January 1, 1888, consisted of seven admirals; eight hundred officers, including engineers and surgeons; and 14,437 non-commissioned officers, marines, and sailors. Besides the port of Kiel, Germany has two other ports, Dantzig and Wilhelmshaven. In the naval manœuvres the



last-named port was subjected to a sham attack, which was repelled in a way to prove in the eyes of the umpires that the place was impregnable. When William II. succeeded to the throne, the project of a further development of the iron-clad navy by adding to the number of armored battleships and replacing with modern vessels those of obsolete type came into favor, and General von Caprivi, who had given his attention chiefly to coast defenses and unarmored fast cruisers, retired from the naval office, to be succeeded by Vice-Admiral Count von Monts, who has undertaken to build up a navy that shall be superior to that of any of the second-rate naval powers, not even excepting Italy, for offensive as well as defensive purposes.

In the naval budget estimates for 1889-90 the government proposed the expenditure, in the space of six years, of 116,800,000 marks on the construction of twenty-eight new vessels, four of which will be first-class ironclads of the latest designs, costing 9,300,000 marks each; seven are to be protected cruisers, costing 5,500,000 marks each; and of the others four will be unprotected cruisers, two avisos and two torpedo division boats.

*Finances.*—The budget for the year ending March 31, 1889, estimates the receipts of the German empire at 921,689,140 marks, derived from the following sources:

| Sources of Revenue.             | Marks.      |
|---------------------------------|-------------|
| Customs and Excise Duties.....  | 493,360,610 |
| Stamps .....                    | 27,655,000  |
| Posts and Telegraphs.....       | 30,064,098  |
| Printing Office.....            | 1,086,090   |
| Railways.....                   | 18,284,100  |
| Imperial Bank.....              | 1,741,500   |
| Departmental Receipts.....      | 9,848,753   |
| Interest of Invalid Fund.....   | 26,359,414  |
| Interest of Imperial Funds..... | 943,000     |
| Extraordinary Receipts.....     | 99,676,566  |
| Federal Contributions.....      | 212,670,009 |
| Total.....                      | 921,689,140 |

The estimated ordinary expenditure is 771,961,697 marks. The following are the principal items:—Expenditures for the army, 362,465,061 marks; navy, 35,900,751 marks; imperial treasury, 271,266,326 marks; interest on the national debt, 27,803,000 marks; pension fund, 28,717,888 marks; invalid fund, 26,359,414 marks.

The estimated extraordinary expenditure includes a deficit of 22,157,246 marks in the finances of 1886-87; 77,267,954 marks of expenditure for military purposes; 12,920,318 marks for the interior. The federal contributions toward the revenue of 1887-88 were 186,937,315 marks.

The total funded debt was estimated to be 576,372,000 marks on October 1, 1887. The whole debt bears interest at four per cent. There was also an unfunded debt of 138,868,475 marks on April 1, 1887. As an offset to the public debt there are several invested funds, amounting to 666,241,100 marks. These include the invalid fund, the fortification fund, the parliamentary buildings fund, and the war treasure of 120,000,000 marks.

*Canals.*—Germany has not many canals. In South Germany the Ludwigs canal was, until the annexation of Alsace-Lorraine, the only one of importance. It extends from the Main at Bamberg to Kelheim on the Danube. Alsace-Lorraine has canals for connecting the Rhine with the Rhone and the Marne. In the east of the North German plain a canal by which Russian grain is conveyed to Königsberg, joins the Pregel to the Memel. The Netze canal unites the Vistula and the Oder. The upper Silesian coal field is in communication with the Oder by means of a canal. The greatest number of canals is found around Berlin; they serve to join the Spree to the Oder and Elbe. The Meuse and the

Rhine are also connected by a canal. By 1895 the Baltic and North Sea ship canal will be completed. It is intended primarily for strategical purposes, but will also facilitate navigation and commerce in this part of Europe, and alter the course of trade in favor of Germany. The canal will run from Holtenau, in the Gulf of Kiel, in a southwesterly direction, by way of Rendsburg, to a point on the Elbe, below Hamburg, about half way between Brunsbüttel and St. Margarethen. Its length will be sixty-one miles, its breadth at the surface of the water one hundred and ninety-six feet, and at the bottom eighty-four feet, and its depth twenty-seven feet. There will be one lock at each end. It is intended in the future to extend the ship canal from the Elbe across the northern part of Hanover to the Jade, on which Wilhelmshaven is situated, which will enable ships of war to pass between that port and Kiel without going to sea, and afford means of communication between all the German naval ports, even if an enemy held entire command of the German Ocean.

*Religion.*—Almost two-thirds of the population belong to the Evangelical Church, and rather more than a third to the Church of Rome. The dissenters are very inferior in numbers, amounting to only about 100,000 souls, but the Jewish element, represented by half a million ( $1\frac{1}{4}$  per cent.), is more considerable than in any other state of West, North or South Europe.

The adherents of Protestantism are divided by their confessions into Reformed and Lutheran. To unite these the "church union" has been introduced into several Protestant states, as for example in Prussia and Nassau in 1817, in the Palatinate in 1818, and in Baden in 1822. Since 1817 the distinction has accordingly been ignored in Prussia, and Christians are there enumerated only as Evangelical or Catholic. The union, however, has not remained wholly unopposed—a section of the more rigid Lutherans who separated themselves from the state church being now known as Old Lutherans. In 1866 Prussia annexed Hanover and Schleswig-Holstein, where the Protestants were Lutherans, and Hesse, where the Reformed Church had the preponderance. The inhabitants of these countries opposed the introduction of the union, but could not prevent their being subordinated to the Prussian oberkirchenrath (high church-council), the supreme court of the state church.

There are six Roman Catholic archbishoprics within the German empire—Breslau (where the archbishop has the title of prince-bishop), Gnesen-Posen, Cologne, Freiburg (Baden), Munich-Freising, and Bamberg. The eighteen bishoprics are—Ermland (see at Frauenburg, East Prussia), Kulm (see at Pelplin, West Prussia), Fulda, Hildesheim, Osnabrück, Paderborn, Münster, Limburg, Treves, Metz, Strasburg, Spire, Würzburg, Ratisbon, Passau, Eichstädt, Augsburg, Rottenburg (Württemberg). An apostolic vicarage exists in Dresden. In recent years numerous convents, especially in Prussia, have been suppressed. The order of the Jesuits is interdicted in Germany.

*Old Catholics.*—After the infallibility of the pope had been proclaimed as a dogma by the Vatican council in 1871, several communities as well as individuals declared their secession from the Roman Church. They are called Old Catholics, and they have selected a bishop who has been acknowledged by most of the states. January 1, 1877, the denomination had 121 congregations with fifty-six clergymen and 16,557 adult male adherents, so that we may fairly estimate the total number of Old Catholics at a little more than 50,000.

The number of Greek Catholics was 2,660 in 1871.

*Language.*—The German-speaking nations, in their various branches and dialects, are found to extend in a



compact mass along the shores of the Baltic and of the North Sea, from Memel in the east to a point between Gravelines and Calais, near the Straits of Dover. On this northern line, the Germans come in contact with the Danes who inhabit the northern parts of Schleswig within the limits of the German empire. A line from opposite Sonderburg, in the isle of Alsen to Tondern in the west, will nearly form the boundary between the two idioms. The German-French frontier traverses Belgium from west to east, touching the towns of St. Omer, Courtrai, and Maastricht. Near Eupen, south of Aix-la-Chapelle, it turns southward, and near Arlon southeast as far as the crest of the Vosges mountains, which it follows up to Belfort, traversing there the watershed of the Rhine and the Doubs. In the Swiss territory the line of demarkation passes through Biel, Freiburg, Saanen, Leuk, and Monte Rosa. In the south the Germans come into contact with Ræto-Romans and Italians, the former inhabiting the valley of the Vorder-Rhein and the Engadine, while the latter have settled on the southern slopes of the Alps, and are continually advancing up the valley of the Adige. Carinthia and Styria are inhabited by German people, except the valley of the Drave toward Klagenfurt. Their eastern neighbors there are first the Magyars, then the northern Slavs and the Poles. The whole eastern frontier is very much broken, and cannot be described in a few words. Besides detached German colonies in Hungary, the western parts of that country are held by Germans. The river March is the frontier north of the Danube from Presburg as far as Brünn, to the north of which the German regions begin near Olmütz—the interior of Bohemia and Moravia being occupied by Czechs and Moravians. In the Prussian provinces of Silesia and Posen the eastern parts are mixed territories, the German language progressing slowly among the Poles. In Bromberg and Thorn, in the valley of the Vistula, German is prevalent. In West Prussia, some parts of the interior, and in East Prussia, a small region along the Russian frontier, are occupied by Poles (Kassubians in West Prussia, Masurians in East Prussia). The German tongue is also fast invading the Lithuanian territory, and in a short time no people speaking that idiom will be found to the left of the river Memel. The total number of German-speaking people, within the boundaries wherein they constitute the compact mass of the population, may be estimated, if the Dutch and the Flemings be included, at fifty-six millions.

The geographical limits of the German language thus do not quite coincide with the German frontiers. The empire contains about three and one-third millions of persons who do not make use of German in everyday life, not counting the 290,000 resident foreigners. The non-German languages have their representatives only in Prussia, Saxony, and Alsace-Lorraine.

*Education.*—In point of intellectual culture Germany ranks high. Much is done by the government for the promotion both of primary and secondary education. Elementary education is general and compulsory throughout Germany. In 1886 only 1.06 per cent. of the recruits of the army could neither read nor write. Among 169,240 recruits, which was the number that entered the army in 1887, there were 163,203 who had received an education in Germany, 4,822 were educated in some foreign language, and 1,215 were illiterate. In 1881 there were 57,000 elementary schools, with 7,100,000 pupils, in Germany. In 1885 there were 347 normal schools, with 26,281 pupils; 858 gymnasia, with 186,766 students; and 270 realschulen, with 49,196 students. In addition there were, in 1887, nine technical high schools, with 3,085 students; and 4,346 industrial and special schools.

There are twenty-one universities in Germany, with a total number of professors and pupils, respectively, of 1,913 and 20,826.

All the universities have four faculties (except Münster). As regards theology, Bonn, Breslau and Tübingen have both a Protestant and Catholic faculty; Freiberg, Münster, Munich and Würzburg are exclusively Catholic; and all the rest are Protestants. As to the number of students Berlin takes the lead, with 4,654 (in 1888). Munich follows, with 3,167, and Leipzig, with 3,031. Other universities with over a thousand students are Halle (1,529); Tübingen (1,464); Würzburg (1,453); Breslau (1,406); Bonn (1,400); Freiburg (1,197); Greifswald (1,115); Göttingen (1,108); Marburg (1,008). The oldest university is Heidelberg, being founded in 1386; then come Leipzig, founded in 1409; Greifswald, dating from 1456, and Tübingen from 1477. The youngest universities are Breslau and Berlin, dating from 1811 and 1810, respectively.

Mental culture and a general diffusion of knowledge are extensively promoted by means of numerous public libraries established in the capitals, the university towns and other places. The most celebrated public libraries are those of Berlin (800,000 volumes), Munich (800,000 volumes and 22,000 manuscripts), Göttingen, Dresden, Stuttgart, Hamburg, Strasburg, Frankfort-on-the-Main, Breslau, Gotha, and Wolfenbüttel.

There are also numerous societies and unions, some being of an exclusively scientific character, and others being designed for the popular diffusion of useful knowledge. The academies of science in Berlin, Munich, Göttingen, and Leipzig are government institutions.

There are twenty-two observatories in the empire, viz., at Altona, Berlin, Bonn, Bothkamp in Schleswig, Breslau, Dantzic, Düsseldorf, Gotha, Göttingen, Hamburg, Kiel, Königsberg, Liepsic, Lübeck, Mannheim, Marburg, Munich, Potsdam, Schwerin, Spire, Strasburg, and Wilhelmshaven.

The book trade, from the important position it has gradually acquired since the time of the Reformation, is to be regarded as at once a cause and a result of the mental culture of Germany. Leipzig is the center of the trade. The number of booksellers in Germany was not less than 5,196 in 1878, among whom were 1,546 publishers.

While in England a few important newspapers have an immense circulation, the newspapers of Germany are much more numerous, but individually command a far more limited sale. Leaving out of account insignificant local papers, Germany in 1878 possessed 600 newspapers published daily, or two to three times a week; of these only ninety were published in South Germany. Berlin alone produces forty-four newspapers. Most readers receive their newspapers through the postoffice or at their clubs, which may help to explain the smaller number of copies sold. Only fifty of the six hundred daily newspapers print more than 10,000 copies, and only twenty more than 20,000.

There are many academies which have for their object the promotion of a taste for painting, sculpture, architecture, and music, and the improvement of the technique of art. The largest academy is now that of Berlin. The three schools of painting are represented by the academies of Berlin, Munich, and Düsseldorf. Other academies for painting are to be found in Dresden, Karlsruhe, Weimar, and Königsberg. The chief musical academy is at Leipzig.

The earliest information we have of the Germans, the peoples and tribes who dwelt among the dense forests that stretched from the Rhine to the Vistula and from the Danube to the Baltic Sea, comes to us from the



Romans, the principal authority being Tacitus. The term Germans is of Celtic origin, though its meaning is not precisely known. It was in all probability borrowed by the Romans from the Gauls. The Germans were not one homogeneous nation, but a multitude of separate and independent tribes, who had racial origin, language, and similarity in their mode of life for their only links of connection. The first tribes of Germanic race to come into collision with the arms of Rome were the Cimbri and Teutones, who in 113 B.C. had invaded Styria, and there met with defeat from the troops of the consul Papirius. The next Roman general who made trial of their prowess was Cæsar. When in 58 B.C. he began his campaigns in Gaul, he found several hordes of Germans, mostly Marcomanni and Suevi, settled between the Rhine and the Vosges, and even on the western side of these hills. Appealed to by the Gauls of those regions to free them from their German oppressors, Cæsar, in spite of the redoubtable stature and strength of his enemies, and of their personal valor, inflicted a crushing defeat upon their ambitious chieftain, Ariovistus, and chased him and his followers across the Rhine. Then, continuing his campaign, he drove back (55 B.C.) behind the same river those tribes that had settled on its western side in Belgium, and even followed them into their original seats in Germany in two short campaigns. The tranquillity which was established through his exertions was, however, so seriously disturbed again by 15 B.C. that Augustus felt it necessary to make a serious effort to subjugate these troublesome neighbors of Gaul. Accordingly Drusus was sent (12 B.C.) at the head of eight legions across the frontier; and in four campaigns he was so far successful that he subdued the Batavians, Frisians, and other tribes as far as the Elbe, and likewise the Chatti on the Main. After the death of Drusus in 9 B.C. Tiberius conquered the Tencteri and Usipetes, who lived on the middle Rhine, and afterward the Sicambri and others settled on the lands at its mouth. In 6 A.D. the work was taken up by Varus; but Varus, in attempting to consolidate the Roman power by depriving the Germans of their national institutions and imposing upon them those of the empire, provoked a general revolt of the subject peoples. The animating spirit of this patriotic movement was Arminius, chief of the Cherusci, who not only overthrew Varus, and slew him and his legions (9 A.D.) at one blow in the Teutoburg Forest, but with irresistible élan swept the Romans before him until he had expelled them from German soil. The struggle was renewed by Germanicus, who defeated Arminius and avenged the Roman honor, but at length, in 16 A.D., withdrew his legions. Henceforth the Romans contented themselves with guarding their long frontier next Germany; and in this task they succeeded for some time as much by stirring up dissension among the chiefs of their foemen as by their own military skill. Yet they managed to bring the Frisians and Batavians under their influence, until in 69 a fierce revolt broke out among the latter people, a revolt which was only quelled after a terrible struggle. About one hundred years later the Germans began to reverse the order of things. In the period 166-174 Aurelius was engaged in beating back a formidable incursion of the Marcomanni and Quadi into Roman territory. From the third century we no longer read of single tribes, but of great confederations of tribes, as the Goths, Alemanni, Franks, Frisians, Saxons, Thuringians, and others. These powerful combinations began to harass the Romans all along their frontier line, from the mouth of the Rhine to the middle Danube, attacking the towns and forts, and breaking down the walls they had built to keep this boundary. In 375 began

the movement before which Rome eventually succumbed. The Huns invaded Europe, and by their coming gave rise to what is known as the "Volkerwanderungen" or "Migrations of the Peoples." The races who lay next to Roman territory were being pressed upon more and more by those behind, upon whom the full brunt of the Hunnic attack had fallen, and at last they began to pour across the boundary in such broad deep streams that the dams of the Romans were broken completely down before their onrush. Of the history of Germany itself we learn little more that is authentic until we come down to the times of the Franks, except that the Slavic nations following in the wake of the Huns seized and occupied the lands left vacant by the German emigrants who had gone Romeward, and that of the confederations still remaining at home in their original lands the most important were the Alemanni, the Thuringians, Saxons, Bavarians, and Franks. The historian turns his attention more especially toward the last-named, since by them the kingdoms of France and Germany were subsequently formed.

After the gradual expulsion or retirement of the Romans from Germany, the country necessarily became subdivided into numerous petty states, each governed by its own chief. The erection of the Franko-Merovingian empire in France had given preponderance to the Frankish power on both sides of the Rhine, and when Charlemagne succeeded in 771 to the German as well as the Gallic possessions of his father, Pepin the Short, he found himself possessed of an amount of territory and a degree of influence which speedily enabled him to assert supremacy over the whole of the west of Germany, while his conquests over the heathen Saxons in the north, and the Avars who then held Pannonia in the southeast, extended his German dominions from the North Sea to the Alps, and from the Rhine as far as Hungary. With Charlemagne, who received the imperial crown at the hands of the pope in 800, began the long line of emperors and kings who occupied the German throne for more than a thousand years; and with him, too, ended the stability of the vast fabric which he had reared on the ruins of Roman power, for at his death in 814, no member of his family was competent to wield the imperial scepter. Although in 843 some portions of his German possessions fell, in accordance with the treaty of Verdun, to his grandson Ludwig, surnamed "the German," who was recognized as king of Germany or East Francia, the final and absolute partition did not take place till 887, when Arnulf seized the eastern throne. On the extinction, in 911, of the degenerate Carolingian dynasty in the person of Ludwig "the Child," the provincial rulers, who, together with the archbishops, bishops and abbots, constituted the chief members of the diet or national assembly, arrogated to themselves (in imitation of the practice of the nobles of the ancient German tribes) the right of electing their sovereign, who, however, could not assume the imperial title till he had been crowned by the pope. At this period there were in Germany five nations—the Franks, Saxons, Bavarians, Swabians, and Lorrainers. The Franks, as the descendants of those who had conquered the land and founded the empire, enjoyed a preëminence over the others; and hence, on the extinction of the Carolingian race, the choice of the prince-electors seems to have fallen almost as a matter of course on the chief of the Franks, the Duke of Franconia, who reigned as king of Germany from 911 to 918, under the title of Conrad I. At his own instigation, his rival and adversary, Henry, Duke of Saxony, was chosen as his successor, and proved himself an able and warlike prince. The conquests of this great prince over the Danes, Slavs, and especially



over the terrible Magyars, were confirmed and extended by his son and successor, Otho I. (936-973), who carried the boundaries of the empire beyond the Elbe and Saale, and who, by his acquisition of Lombardy, laid the foundation of the relations which existed for many ages between the rulers of Germany and the Italian nation. Otho's coronation-festival was eventful, as it formed the precedent for the exercise of those offices which, till the dissolution of the empire were regarded as connected with the dignity of the secular electors; for on that occasion, while the emperor dined with his three spiritual electors, he was waited upon by the secular princes—the Elector of Bavaria (afterward of Saxony) serving as grand-marshal; of Swabia (afterward of Bohemia), as grand-cupbearer; and of Lorraine (afterward of Brandenburg), as arch-chamberlain.

Otho II. (973-983), Otho III. (983-1002), and Henry II. (1002-24) belonged to the House of Saxony, and which was succeeded by that of Franconia, in the person of Conrad II. (1024-39), an able ruler, who added Burgundy to the empire. His son and successor, Henry III. (1039-56), temporarily extended German supremacy over Bohemia, Denmark, and Hungary, while he repressed the insolence and despotism of the great nobles of Germany. And while his stern piety moved him to interfere with force in the strife over the papal chair, he also gained the respect of his contemporaries by his zeal for justice and his valor in the field. The minority of his son and successor, Henry IV. (1056-1106), enabled the nobles to recover much of their former power, and to apply a check to the further consolidation of the imperial authority, which had been considerably extended under the two preceding reigns. Henry's constant quarrels with the astute Gregory VII. entangled him in difficulties and mortifications, which culminated in his humiliation at Canossa, and only ended with his life, and which plunged Germany into anarchy and disorder. The emperor's most formidable rival, Rudolph of Swabia, was defeated and slain in 1080. With his son and successor Henry V. (1106-25), who made peace with the papacy by the Concordat of Worms in 1122, the male line of the Franconian dynasty became extinct; and after the crown had been worn (1125-37) by Lothair of Saxony, who made a bold attempt to recover some of the prerogatives of which at his election the empire had been deprived through papal intrigues, the choice of the electors, after a season of dissension and intrigue, fell upon Conrad III. (1138-52), Duke of Franconia, the first of the Hohenstaufen dynasty. His reign, in which the civil wars of the GUELPHS (*q.v.*) and Ghibellines began, was distracted by the dissensions of the great feudatories of the empire, while the strength of Germany was wasted in the disastrous Crusades, in which Conrad took an active part. On his death the electoral college for the first time met at Frankfort, which retained the honor of being the place at which the sovereign was elected and crowned till the dissolution of the empire in the nineteenth century. Frederick I. (1152-90), surnamed Barbarossa, Duke of Swabia, was, at the recommendation of his uncle Conrad, chosen as his successor, and the splendor of his reign fully warranted the selection. By the force of his character Frederick acquired an influence over the diets which had not been possessed by any of his immediate predecessors, and during his reign many important changes were effected in the mutual relations of the great duchies and counties of Germany, while we now for the first time hear of the *hereditary* right possessed by certain princes to exercise the privilege of election. Unfortunately for Germany, this great monarch suffered the interests of his Italian dominions to draw him away from those of his own country, while

his participation in the Crusades, in which both he and the flower of his chivalry perished, was only memorable for the misfortunes which it entailed on the empire. The interval between the death of Frederick Barbarossa (1190) and the accession of Rudolf I. (1273), the first of the Hapsburg line, which, through a female branch, still reigns in Austria, was one of constant struggle, internal dissension, and foreign wars. Individually, the princes of the Hohenstaufen dynasty were popular monarchs, their many noble and chivalrous qualities having endeared them to the people, while one of the race, Frederick II. (1212-50), was, after Charlemagne, perhaps the most remarkable sovereign of the middle ages; but their ambitious designs on Italy, and their constant but futile attempts to destroy the papal power, were a source of misery to Germany, and with Frederick II. ended the glory of the empire, till it was partially revived by the Austrian House of Hapsburg. His son, Conrad IV. (1250-54), with whom the Hohenstaufen line ended in Germany, was succeeded, after a brief and troubled reign, by various princes, who in turn, or in some cases contemporaneously, bore the imperial title without exercising its legitimate functions or authority. This season of anarchy (known as the Great Interregnum) was terminated at the accession of Rudolf I. (1273-91), who, by the destruction of the strongholds of the nobles, and the stringent enforcement of the laws, restored order. His chief efforts were, however, directed to the aggrandizement of his Austrian possessions, which embraced Styria, Carinthia, Carniola and Tyrol.

For the next 200 years the history of the German empire presents very few features of interest, and may be briefly passed over. Adolf of Nassau, who was elected to succeed Rudolf, was compelled in 1298 to yield the crown to the son of the latter, Albert I. (1298-1308), whose reign is chiefly memorable as the period in which three Swiss cantons, Unterwalden, Schwyz and Uri established their independence. After the murder of Albert the throne was occupied in rapid succession by Henry VII. (1308-13), who added Bohemia to the empire, and, conjointly, by Frederick III. of Austria and Ludwig IV. of Bavaria (1313-47). Charles VI. (1347-78) of Luxemburg was the successful candidate among many rivals; and, although he attended specially to the interests of his hereditary possessions of Bohemia, Moravia, Silesia, and Lusatia, he did not entirely neglect those of the empire, for which he provided by a written compact, known as the *Golden Bull* (1356) which regulated the rights, privileges, and duties of the electors, the mode of the election and coronation of the emperors, the coinage, customs, and commercial treaties of the empire, and the rights and obligations of the free cities. His son, Wenceslaus (1378-1400), who was finally deposed, brought the royal authority into contempt, from which it was scarcely redeemed by Rupert of the Palatinate (1400-10). The nominal reign of Sigmund (1410-37), the brother of Wenceslaus, would demand no notice were it not for his connection with the Council of Constance in 1414, at which Huss was condemned, and which was followed by the disastrous Hussite wars. The readiness with which Sigmund lent himself to the interests of Henry V. of England, and of all other princes who ministered to his love of personal display, brought discredit on the imperial dignity, while his dishonorable desertion of Huss will ever attach ignominy to his name. Albert II. of Austria (1438-39), after a reign of less than two years, in which he gave evidence of great capacity for governing, was succeeded by his cousin, Frederick IV. (1440-93), an accomplished but avaricious and indolent prince, whose chief object seemed to be the aggrandizement of the House of Hapsburg,



with which the title of emperor had now become permanently connected (see AUSTRIA), while he neglected the interests of Germany collectively, and suffered the Tur's to make unchecked advances upon its territory. Maximilian I. (1493-1519), the son and successor of Frederick, resembled him in few respects, for he was active, ambitious, and scheming, but deficient in steadiness of purpose. His marriage with Mary, the rich heiress of her father, Charles the Bold of Burgundy, involved him in the general politics of Europe, while his opposition to the reformed faith preached by Luther exasperated the religious differences which disturbed the close of his reign. Maximilian had, however, the merit of introducing many improvements in regard to the internal organization of the state, by enforcing the better administration of the law, establishing a police and an organized army, and introducing a postal system. With him originated, moreover, the special courts of jurisdiction known as the "Imperial Chamber" and the "Aulic Council;" and in his reign the empire was divided into ten circles, each under its hereditary president and its hereditary prince-convoker. Maximilian lived to see the beginning of the Reformation, and the success that attended Luther's preaching; but the firm establishment in Germany of the reformed faith, and the religious dissensions by which its success was attended, belong principally to the reign of his grandson, Charles I., king of Spain, the son of the Archduke Philip and of Joanna, the heiress of Spain, who succeeded to the empire under the title of Charles V. (1519-56). The management of his vast possessions in Spain, Italy, and the Netherlands, and the wars with France, in which he was so long implicated, diverted him from his German territories, which he committed to the care of his brother Ferdinand. The princes of Germany were thus left to settle their religious differences among themselves, and to quell, unaided by the head of the state, the formidable insurrection of the peasants (1524-25), which threatened to undermine the very foundations of society, and which had followed close upon the nobles' war (1522-23), raised by Ulrich von Hutten and Francis von Sickingen in the vain hope of securing a more united Germany under the emperor. The rising of the lower orders was due to the preaching of the fanatic Münzer, and other leaders of the sect of Anabaptists, which had arisen from a perverted interpretation of some of the tenets advanced by Luther. Charles' determined opposition to the reformers rendered all settlement of these religious differences impracticable; and although, by the aid of his ally, Maurice of Saxony, he broke the confederation of the Protestant princes known as the League of Schmalkald, he was forced by his former ally to sign the peace of Augsburg in 1555, which granted tolerance to the Lutherans; and, in his disgust at the complicated relations in which he was placed to both parties, he abdicated in favor of his brother Ferdinand (1556-64), who put an end to much of the religious dissension that had hitherto distracted the empire, by granting entire toleration to the Protestants. Although Ferdinand was personally mild and pacific, his reign was troubled by domestic and foreign aggressions—the different sects disturbing the peace of the empire at home, while the French and the Turks assailed it from abroad.

During the next fifty years the empire was a prey to internal disquiet. Maximilian II. (1564-76) was indeed a wise and just prince, but the little he was able to effect in reconciling the adherents of the different churches, and in raising the character of the imperial rule, was fatally counteracted by the bigotry and vacillation of his son and successor, Rudolf II. (1576-1612), in whose reign Germany was torn by the dissensions of

the opposite religious factions, while each in turn called in the aid of foreigners to contribute toward the universal anarchy which culminated in the Thirty Years' War, begun under Rudolf's brother and successor, Matthias (1612-19); continued under Ferdinand II. (1619-37), an able, but cruel and bigoted man; and ended under Ferdinand III. (1637-57), by the treaty of Westphalia, in 1648. The effect of the Thirty Years' War was to depopulate the rural districts of Germany, destroy its commerce, burden the people with taxes, cripple the already debilitated power of the emperors, and cut up the empire into a multitude of petty states, the rulers of which exercised almost absolute power within their own territories. Leopold I. (1658-1705), a haughty, pedantic man, did not avail himself of the opportunities afforded by peace for restoring order to the state, but suffered himself to be drawn into the coalition against France; while his hereditary states were overrun by the Turks, and were indebted for their safety to Sobieski, king of Poland. Although success often attended his arms, the cunning of Louis XIV. prevented peace from bringing the emperor any signal advantages; and it was in this reign that Strasburg was attached to the French empire. The reigns of Joseph I. (1705-11) and Charles VI. (1711-40), with whom expired the male line of the Hapsburg dynasty, were signalized by the great victories won by the imperialist general, Prince Eugene, in conjunction with Marlborough, over the French, in the war of the Spanish succession (1702-13). But the treaty of Utrecht (1713) brought no solid advantage to the empire. The disturbed condition of Spain and Saxony opened new channels for German interference abroad. Germany was further distracted, after the death of Charles, by the dissensions occasioned by the contested succession of his daughter, Maria-Theresa, who claimed the empire in virtue of the Pragmatic Sanction drawn up by her father in 1713, and through her of her husband, Francis I. of Lorraine, after their rival, the Bavarian Elector, Charles VII., had by means of Prussian aid been elected in 1742 to the imperial throne. Charles, however, was obliged to cede his crown after a brief occupation of three years. Constant disturbances, intensified during the Seven Years' War (1756-63), when Frederick the Great of Prussia maintained his character of a skillful general at the expense of the Austrians, made the reign of Francis I. (1745-65) one of trouble and disaster. Joseph II., his son (1765-90), during the lifetime of Maria-Theresa, who retained her authority over all the Austrian states, enjoyed little beyond the title of emperor, to which he had succeeded on his father's death. But when he ultimately acquired his mother's vast patrimony he at once entered upon a course of reforms, which were, however, premature, and unsuited to the cases to which they were applied; while his attempts to reestablish the supremacy of the imperial power in the south of Germany were frustrated by Prussian influence.

Leopold II., after a short reign of two years, was succeeded in 1792 by his son Francis II., who, after a series of defeats by the armies of the French Republic, and the adhesion, in 1805, of many of the German princes to the alliance of France, which led to the subsequent formation of the Rhenish Confederation under the protectorate of Napoleon, resigned the German crown, and assumed the title of Emperor of Austria. (See for further details AUSTRIA, NAPOLEON, FRANCE, PRUSSIA, and the articles on the other German states.) From this period till the Congress of Vienna of 1814-15 Germany was almost entirely at the mercy of Napoleon, who deposed the established sovereigns, and dismembered their states in favor of his partisans and dependents, while he crippled the trade of the country,



and exhausted its resources by the extortion of subsidies or contributions. The second peace of Paris (1814) restored to Germany all that had belonged to her in 1792; and, as a reconstruction of the old empire was no longer possible, those states which still maintained their sovereignty combined, in 1815, to form a German Confederation. Of the 300 states into which the empire had once been divided there now remained only thirty-nine, a number which was afterward reduced to thirty-five by the extinction of several petty dynasties. The diet was now reorganized, and appointed to hold its meetings at Frankfort-on-the-Main, after having been formally recognized by all the allied states as the legislative and executive organ of the Confederation; but it failed to satisfy the expectations of the nation, and soon became a mere political tool in the hands of the princes, who simply made its decrees subservient to their own efforts for the suppression of every progressive movement. The festival of the Wartburg, and the assassination of Kotzebue, were seized as additional excuses for reaction; and though the French revolution of 1830 so influenced some few of the German states as to compel their rulers to grant written constitutions to their subjects, the effect was transient, and it was not till 1848 that the German nation gave expression, by open insurrectionary movements, to the discontent and the sense of oppression which had long possessed the minds of the people. The princes endeavored by hasty concessions to arrest the progress of republican principles, and, fully recognizing the inefficiency of the diet, they gave their sanction to the convocation, by a provisional self-constituted assembly, of a national congress of representatives of the people. Archduke John of Austria was elected Vicar of the newly-organized national government; but he soon disappointed the hopes of the assembly by his evident attempts to frustrate all energetic action on the side of the parliament, while the speedy success of the anti-republican party in Austria and Prussia damped the hopes of the progressionists. The refusal of the king of Prussia to accept the imperial crown which the parliament offered him in 1849 was followed by the election of a provisional regency of the empire; but as nearly half the members had declined taking part in these proceedings, or in a previous measure, by which Austria had been excluded, by a single vote, from the German Confederation, the assembly soon lapsed into a state of anarchy and impotence, which terminated in its dissolution. The sanguinary manner in which insurrectionary movements had in the meanwhile been suppressed by Prussian troops both in Prussia and Saxony put an effectual end to republican demonstrations; and in 1850 Austria and Prussia, after exhibiting mutual jealousy and ill-will, which more than once seemed likely to end in war, combined to restore the diet, whose first acts were the intervention in Sleswick-Holstein in favor of Denmark, and the abolition of the free constitutions of several of the lesser states. From that period the diet became the arena in which Austria and Prussia strove to secure the supremacy and championship of Germany; every measure of public interest was made subservient to the view of one or other of these rival powers; and the Sleswick-Holstein difficulties were the principal questions under discussion in the federal parliament down to the rupture between Prussia and Austria, and the dissolution of the Bund in 1866.

The immediate occasion of the war of 1866 was the difference that arose between Prussia and Austria after the convention of Gastein (1865), as to the occupation and disposal of the territory taken from Denmark in the short war of 1864. But the real grounds lay in the rivalry between the states for the leadership of

Germany, the germ of which is as old as the time of the Great Elector, and which has shown itself at many epochs of their history. There can be little doubt that the feeling of the German people, as distinguished from the princes and bureaucracy, had, in recent times at least, been in favor of the purely German Prussia, as their leader, rather than Austria. And when the parliament of Frankfort, in 1849, offered the imperial crown to the king of Prussia, the unity of Germany might have been secured without bloodshed, had the monarch been less scrupulous, or had he had a Bismarck for his adviser. But that opportunity being let slip, and the incubus of the "Bund" being restored, it became apparent that the knot must be cut by the sword.

By the treaty of Gastein Austria and Prussia agreed to a joint occupation of the Elbe duchies; but to prevent collision it was judged prudent that Austria should occupy Holstein, and Prussia Sleswick. Already a difference of policy had begun to show itself; Prussia was believed to have the intention of annexing the duchies; while Austria began to favor the claims of Prince Frederick of Augustenburg. In the meantime, both nations were making ready for the struggle; and Italy, looking upon the quarrel as a precious opportunity to strike a blow for the liberation of Venetia had secretly entered into an alliance with Prussia.

In the sitting of the German diet, June 1, 1866, Austria, disregarding the convention of Gastein, placed the whole matter at the disposal of the Bund, and then proceeded to convoke the states of Holstein "to assist in the settlement of the future destination of the duchy." Prussia protested against this as an insult and a violation of treaty; demanded the reestablishment of the joint occupation; and, while inviting Austria to send troops into Sleswick, marched troops of her own into Holstein. Instead of responding to this invitation, Austria withdrew her forces altogether from Holstein, under protest; and then, calling attention to this "act of violence" on the part of Prussia, proposed that the diet should decree "federal execution" against the enemy of the empire. This eventful resolution was carried by a great majority on June 14, 1866; Hanover, Saxony, Hesse-Cassel and Hesse-Darmstadt voting for it. The resolution having passed, the Prussian plenipotentiary, in the name of his government, declared the German Confederation dissolved forever, and immediately withdrew.

Thereupon identical notes were sent by Prussia to the courts of Saxony, Hanover, and Hesse-Cassel. The terms were not accepted, and the Prussian troops at once took military possession of the three kingdoms without resistance. War was now declared against Austria; the Prussian host, numbering in all 225,400 men, with 774 guns, invaded Bohemia at three several points. The Austrians, who had been surprised in a state of ill-organized unreadiness, had assembled an army of 262,400 men and 716 guns; and the greater portion of these were stationed, under General Benedek, behind the Riesengebirge, expecting the attack from Silesia. The Prussian armies meanwhile crossed the Erzgebirge without opposition, drove the Austrian army steadily and quickly back with heavy losses, and, after effecting a junction, moved steadily forward to meet the Austrian army, now concentrated between Sadowa and Königgrätz. Here, on July 3d, was fought the decisive battle. The Austrian cavalry made heroic efforts to turn the tide of victory; but the stern trained valor of the Prussians, armed with the till then little known breech-loading "needle-gun," was invincible, and the Austrian army was broken and dissolved in precipitate flight. The Prussians lost upward of 9,000 killed and wounded; the Austrian loss was 16,235 killed and



wounded, and 22,684 prisoners. After this decisive defeat, which is known as the battle of Königgrätz or Sadowa, all hope of staying the advance of the Prussians with the army of Benedek was at an end; a truce was asked for, but refused; and not till the victorious Prussians had pushed forward toward Vienna, whither Benedek had drawn his beaten forces, was a truce obtained through the agency of the emperor of the French, the peace of Prague (August 20th). Italy, though more than half-inclined to stand out for the cession by Austria of the Trentino, as well as Venetia, reluctantly agreed to the armistice (August 12th).

A brief campaign sufficed for the defeat of the minor states of Germany that had joined Austria—viz., Bavaria, Württemberg, Baden and Hesse-Darmstadt; and, after peace had at last been arranged, some of them were forced to submit to a certain loss of territory. Saxony only escaped incorporation with Prussia through the resolute opposition of Austria supported by France; but the little kingdom, like all the other states that had taken arms against Prussia, was forced to pay a heavy war indemnity. Even the little principality of Reuss had to pay 100,000 thalers into the fund for Prussian invalids. The states north of the Main which had taken up arms against Prussia were completely incorporated—viz., Hanover, Hesse-Cassel, Nassau, Frankfurt and a small portion of Hesse-Darmstadt, as well as Sleswick-Holstein and Lauenburg; and the other states north of the Main were united with Prussia in a confederacy of a more intimate nature than before existed, called the North German Confederation.

Austria, by the treaty of Prague (August 20, 1866), was completely excluded from participation in the new organization of the German states, and formally agreed to the surrender of Venetia to Italy, to the incorporation of Sleswick-Holstein with Prussia, and to the new arrangements made by Prussia in Germany. A portion of the fifth article of this treaty secured that, if the "inhabitants of the northern districts of Sleswick declare, by a free vote, their desire to be united to Denmark, they shall be restored accordingly;" but this was withdrawn in 1878, by secret treaty between Austria and Germany. Though losing no territory to Prussia, Austria had to pay 40,000,000 of thalers for the expense of the war.

The North German Confederation, as thus constituted, possessed a common parliament, elected by universal suffrage, in which each state was represented according to its population. The first or constituent parliament met early in 1867, and adopted, with a few modifications, the constitution proposed by Count Bismarck. The new elections then took place, and the first regular North German parliament met in September, 1867. According to this constitution, there was to be a common army and fleet, under the sole command of Prussia; a common diplomatic representation abroad, of necessity little else than Prussian; and to Prussia also was intrusted the management of the posts and telegraphs in the Confederation.

The southern German states which up to this point had not joined the Bund, were Bavaria, Baden, Württemberg, Hesse-Darmstadt, and Liechtenstein, with a joint area of 43,990 square miles, and a total population (1866) of 8,524,460. But, though these states were not formally members of the Bund, they were so practically, for they were bound to Prussia by treaties of alliance offensive and defensive, so that in the event of a war the king of Prussia would have at his disposal an armed force of upward of 1,100,000 men.

During the next few years the North German Confederation was employed in consolidating and strengthening itself, and in trying to induce the southern states

to join the league. The Zollverein was remodeled and extended, until by the year 1868 every part of Germany was a member of it, with the exception of the cities of Hamburg and Bremen, and a small part of Baden. This paved the way for the formal entrance of the southern states into the confederation; but they still hung back, though the ideal of a united Germany was gradually growing in force and favor.

In the spring of 1867 a war between Prussia and France seemed imminent, from difficulties arising out of the occupation of Luxemburg by the former; but by the good offices of the British Government, a congress of the great powers (Italy included) was assembled at London, at which an arrangement satisfactory to both nations was amicably agreed upon, Luxemburg remaining in the possession of the king of Holland. It was evident, however, that hostilities had only been postponed, and on both sides extensive military preparations were carried on.

In 1870 the long-threatened war between Prussia and France broke out. On July 4th of that year the provisional government of Spain elected Prince Leopold of Hohensollern, a relative of King William of Prussia, to fill their vacant throne. This step gave the greatest umbrage to the French Government; and though by the advice of William I. of Prussia, Prince Leopold resigned his candidature, it was not satisfied, but demanded an assurance that Prussia would at no future period sanction his claims. This assurance the king refused to give; and on July 19th, the emperor of the French proclaimed war against Prussia. Contrary to the expectation of France, the southern German states at once decided to support Prussia and the northern states, and placed their armies, which were eventually commanded by the Crown-prince of Prussia, at the disposal of King William.

By the end of July the forces of both countries were congregated on the frontier. Napoleon, however, lost a fortnight in delays after the declaration of war, and it was discovered that the French army was by no means in a state of satisfactory preparation, while the Germans were splendidly organized, and much superior in number. The result was that the French, instead of marching to Berlin as they anticipated, never crossed the Rhine, and had to fight at a disadvantage in Alsace and Lorraine.

On August 2d the French obtained some trifling success at Saarbrück, but the rapidly following battles of Weissenburg (August 4th) Wörth, and Spicheren (both August 6th) were important German victories. The German advance was hardly checked for a moment, though the losses on both sides were very heavy. The battle of Gravelotte, in which King William commanded in person, was fought on the 18th; and, though the Germans suffered immense loss, they were again victorious, and forced Bazaine to shut himself up in Metz. The Emperor Napoleon and Marshal MacMahon in vain attempted to proceed to the relief of Bazaine. They were surrounded at Sedan, and completely defeated with heavy loss. The emperor surrendered on September 2d, with his whole army, about 90,000 men, and was sent as a prisoner into Germany. By the 19th of September the Prussians had reached Paris, and commenced a vigorous siege. Strasburg capitulated on the 27th, after a severe bombardment, and on October 28th Bazaine surrendered Metz with an army of 6,000 officers and 173,000 men, 400 pieces of artillery, 100 mitrailleuses, and 53 eagles. Verdun capitulated on November 8th; Thionville followed on the 24th; after which there were several capitulations of lesser importance.

The French made extraordinary efforts to raise armies



and relieve Paris, but, with the exception of a momentary gleam of success on the Loire, they met with nothing but severe defeats. Of these may be mentioned the battle of December 3d in the forest of Orleans, and that of Le Mans, January 12th, in which contests Prince Frederick-Charles took all together 30,000 prisoners. After numerous unsuccessful sorties, and enduring great sufferings from famine, Paris surrendered on January 29th, and the war was virtually at an end. The French army of the east, 80,000 strong, under Bourbaki, was compelled to retire to Switzerland on the 31st. By the peace of Frankfort (May 10, 1871) France was condemned to pay a war indemnity of five milliards of francs, or \$1,000,000,000; and the province of Alsace, along with the German part of Lorraine, was ceded to Germany.

A very important result of the war was to complete the fusion of the northern and southern states of Germany. The southern states joined at once in the war against France; in November, 1870, Baden and Hesse leading the way, they all became members of the German Confederation; and next month the re-establishment of the German empire was almost unanimously resolved, with the king of Prussia as hereditary emperor. It was at Versailles, on January 18, 1871, that the king was proclaimed emperor of Germany.

The new German empire set vigorously to work to organize itself as a united federation, under the skillful leadership of Prince Bismarck, who was appointed Reichskanzler or Imperial Chancellor. Almost at once it found itself involved in the ecclesiastical contest with the Church of Rome, known as the "Kulturkampf," which had previously begun in Prussia. The origin of the struggle was an effort to vindicate the right of the state to interfere, somewhat intimately, with the behavior, appointments, and even educational affairs of all religious societies in the country. The Jesuits were expelled in 1872, and Pope Pius IX. retorted by declining to receive the German ambassador. The famous Falk or May Laws were passed in Prussia in 1873-4-5, and some of their provisions were extended to the empire. Several German prelates, refusing obedience, were expelled from Germany; and the disorganization in ecclesiastical affairs became so serious that the Reichstag passed a law in 1874 making marriage a civil rite. The pope issued an encyclical declaring the Falk laws invalid, and matters seemed for a time to be at a deadlock. On the election of a new pope, Leo XIII., in 1878, attempts were made to arrange a compromise between the empire and the papal see. Falk, the Prussian "Kultus"-minister, resigned in 1879, and certain modifications were made in the obnoxious laws in 1881 and 1883. Bismarck took a further step toward Canossa in 1885 when he proposed the pope as arbiter between Germany and Spain in the dispute as to the possession of the Caroline Islands; and he practically owned himself beaten in the concessions which he granted in revisions of the politico-ecclesiastical legislation in 1886 and 1887. Another semi-religious difficulty which demanded government interference was the social persecution of the Jews (*Judenhetze*), which reached a climax in 1880-81.

In more strictly political affairs the rapid spread of socialism excited the alarm of the government. Two attempts on the life of the emperor (in May and June, 1878) were attributed more or less directly to the Social Democrat Organization, and gave the signal for legislative measures conferring very extensive powers upon the administration to be used in suppressing the influence of socialism. These socialist laws, though limited in duration, have invariably been renewed (sometimes with added stringency) before their validity expired;

in 1889 several of the most important towns of the empire were in what is called "the minor state of siege" for police purposes, and a new permanent socialist law was proposed by government in October of that year. A plot, happily futile, to blow up the emperor and other German rulers at the inauguration of the National Monument in the Niederwald in 1883 was considered by government to justify its repressive measures. Prince Bismarck, however, was not content with repressive measures; he has endeavored by improving the condition of the working-classes to cut the ground from beneath the feet of the socialistic propagandists. The acknowledgment in the emperor's message to the Reichstag in 1881, that the working classes have a right to be considered by the state, was followed by laws compelling employers to insure their workmen in case of sickness or of accident, and by the introduction (1888) of compulsory insurance for workmen against death and old age—measures that have been by some called "state-socialism."

The energetic commercial policy of government also, which since 1879 has been strongly protectionist, has its springs in similar considerations; and the recent colonial policy, which began in 1884 with the acquisition of Angra Pequena, may be considered to be stimulated partly by desire to gratify the national self-respect, and partly to provide new outlets under the German flag for the surplus population, and new markets for the home manufactures. None of the German colonies as yet, however, either in Africa or the Pacific Ocean, have proved of any great commercial value. The assembling of the Congo Congress at Berlin in 1885 fitly marked Germany's admission to the list of colonial powers. On the maintenance and improvement of the army and navy the German government has bestowed the most unremitting care, urged especially by the attitude of the "Revanche" party in France, though hitherto the imperial policy has been entirely pacific.

Considerable parliamentary friction has been caused more than once by the unwillingness of the Reichstag to vote military supplies to the amount and in the manner demanded by the emperor and chancellor. The latter desire to have practically a free hand in military matters, while the national parliament seeks to exercise a constitutional control over the army resembling that illustrated in Great Britain by the annual Mutiny Act. A compromise was effected in 1874 in virtue of which the military strength was fixed and the supplies granted for the periods of seven years at a time. In 1886 the government proposed to terminate the current *Septennat* in 1887 instead of 1888, and to immediately add largely to the peace strength of the army. On the rejection of the bill the Reichstag was dissolved (January, 1887) by the emperor, and an appeal made to the country. The Iron Chancellor still possessed the confidence and the gratitude of the people, and the new elections in February, 1887, resulted in a crushing defeat for the opponents of the government, notably the Freisinnige and the Social Democrats. One of the most remarkable features of this election was a letter written by the pope in favor of the army bill, for which he subsequently received a *quid pro quo* in a further modification of the May laws. The Military Septennate Bill was immediately passed, and was followed in 1888 by a Military Organization Bill, which made several changes in the conditions of service in the *Landwehr*. The subsequent budgets show an enormous increase in the extraordinary military expenditure. While thus seeking peace by preparing for war, Germany has not failed to use diplomacy for the same end.

A personal meeting of the emperors of Germany, Austria, and Russia in 1872 was considered a proof of a



political alliance (*Dreikaiserbund*); and, when Russia drifted somewhat apart from Germany in 1878, an offensive and defensive alliance was formed between Austria and Germany in 1879. Italy afterward entered this Triple Alliance. Germany's influence on the Eastern question was recognized in 1878, when the plenipotentiaries of the powers met at the Congress of Berlin.

On March 9, 1888, the Emperor William I. died. His son Frederick, at that time suffering from a cancerous affection of the throat, immediately issued a proclamation, in which he promised to consider "new and unquestionable national needs," and it was understood and to some extent felt that a more liberal era had commenced. The new emperor, however, died on June 15th, and William II., his son, who succeeded, at once recurred to the policy of William I. and Prince Bismarck. Much painful excitement was caused by a medical dispute as to the nature and cause of the late emperor's fatal illness, which speedily developed into a party question, discussed on both sides with virulent acrimony. The latter part of 1888 and the year 1889 were devoted by the young emperor to visiting the courts of several of his fellow-sovereigns in Europe. Germany continued to extend her colonial empire, not, however, without coming to blows with the natives; and in Samoa became temporarily involved in hostilities with one of the chiefs. Difficulties on the east coast of Africa led, in 1888, to a blockade by the British and German fleets to prevent the importation of arms and to check the slave trade. This lasted until October, 1889.

*German Language.*—In its ordinary sense the name German Language or *Deutsche Sprache* is now generally used to denote, in all their stages from the earliest time to the present day, the different languages and dialects of Teutonic origin spoken in the German and Austrian empires and in Switzerland, not including, however, the Frisian language, which once was spoken, and still in a few remnants survives, on the shores and islands of the German Ocean, nor the dialects of the Danish population of northern Schleswig. Flemish and Dutch, although very closely connected with German, are likewise excluded. But even in the stricter sense the designation *Deutsch* is not of very long standing, nor has the word always been a real proper name for a distinct people or tribe. In Bishop Ulfila's Gothic version of the Bible we find the adverb *thiudisko*, which is clearly a derivative from *thiuda*, meaning primarily "after the manner of the people." German writers of the earlier centuries were therefore as fully justified in calling their own language *diutisc*, or, in a Latinized form, *theudiscus*, *theotiscus*, that is, their popular or vernacular language, as were those mediæval Latin writers of all nations who distinguished their national languages by the name of *lingua vulgaris* from Latin, the only literary language fully acknowledged in their time. It was not until the tenth century that another Latinized form frequently used in later times, viz., *teutonicus*, began to be used instead of the older *theotiscus*, of which the only rivals in former times had been such local names as *franciscus* (*frenkisc*) or *saxonicus*, which were no doubt derived from the names of single tribes, but were often also used in the same comprehensive sense as *theotiscus*, without necessarily implying any allusion to dialectical differences between the languages of the tribes they properly belonged to. The last name we have to mention here is the Latin *Germanus*, with its different derivatives in the modern languages, including the English form *German*. Many attempts have been made to elucidate the origin of this word, but as yet nothing can be taken for certain beyond the fact that it is neither of Latin nor of German origin. Most prob-

ably it was a Celtic word, and, according to what Tacitus says in his *Germania* (ch. ii.), it was originally the name of a Celtic tribe, from which, by some strange error of the Roman and Greek historians, it has been transferred to the non-Celtic inhabitants of Germany. Accordingly the name has never been used by the Germans themselves except in imitation of its use in the works of Latin writers.

As to its geographical extension the German language has undergone very great changes in the course of the last two thousand years. At the dawn of history no Germans were to be found to the left of the Rhine, and even to the right of it Celtic tribes occur in the earliest times. There were Celts also in the south of the present Germany as far north at least as the Danube and the Main; Bohemia, too, derives its name from an early Celtic population, the Boii. Only the midland and north were inhabited by Germanic nations or tribes, stretching as far east as Poland, and perhaps covering even parts of the adjoining territories of Russia, where Slavonic and Finnish tribes were their neighbors. But of these Germanic tribes and their languages some have left no equivalents in our modern German tribes and dialects. We have mentioned the Frisian language as not belonging to German in its proper sense, although the Frisians have kept their original residence up to the present day, and have always been in constant connection and frequent intercourse with their "German" neighbors. Many other tribes have wandered from their seats and colonized other countries. It was as late as the middle of the fifth century that the Jutes, Angles and Saxons began their voyages of conquest to England, where they founded a new people and a new language, leaving their native soil open to Danish invasions. Much earlier the midland tribes had already been slowly pushing on to the west and south, and expelling or subduing and assimilating the Celtic owners of the territories they invaded. But what was gained in these parts was counterbalanced by great losses in the north and east. The territories about the lower and middle Elbe, Oder, and Vistula, abandoned by the Lombards, the Burgundians, the Goths, and some other Germanic tribes, as well as Bohemia, which for some short time had been in the possession of the German Marcomans, were soon filled up by the immigration of numerous tribes of the great Slavonic family. Without going into details of the facts which are well known to the student of history, we may simply state that, since about 500 A.D., when the great migration of the nations had come to an end so far as Germany was concerned, no further change of any great importance has taken place in the western and southern parts. In the east the German population at this time did not go beyond a line that may be drawn from about Kiel to the Böhmerwald, passing near Hamburg, Magdeburg, Naumburg, Coburg and Baireuth. As is well known, it is in later centuries that almost all the eastern districts have been recovered to German.

In the sixth century the remains of the numerous smaller Germanic tribes, mentioned before and during the migration of the nations, had consolidated into seven larger bodies or aggregations of tribes. The Frisians still held the extreme north of Holland and Germany. Their midland and eastern neighbors were then called by the new name of Saxons, borrowed from the Saxons who had left the Continent for England. In the main parts of the Netherlands and Belgium, along both sides of the Rhine, and across Germany to the Thuringian and Bohemian Forests, the powerful Frankish confederation had established itself, and it soon incorporated the smaller and less vigorous tribes of the Hessians and Thuringians, which were surrounded by the midland or eastern Franks, the Saxons, and the Slavs. Alsatia,



Switzerland, and South Germany eastward to the river Lech were occupied by the Alemannians, while the inhabitants of the remaining districts of the present Bavaria and Austria bore the collective name of Bavarians.

The history of the German language cannot be severed from the history of these tribes, for Frisian, Saxon, Frankish (Hessian, Thuringian,) Alemannian, and Bavarian are the leading dialects of the Continental branch of the Teutonic family. Having no specimens of the languages of the Continental tribes for nearly three centuries after their final settlement, we cannot tell to what extent they originally agreed with or differed from each other, although there must have been some dialectical differences to begin with, which were afterward increased and multiplied, partly by phonetic changes (most probably resulting from scarcely discernible phonetic peculiarities, which, even in the earliest times, must have prevailed in those idioms), and partly by such alterations of the inflexional systems as are known to occur frequently in all languages whose character is not merely literary. But, however scanty our means of illustrating the earliest history of these idioms may be, there is no doubt that they were not all of them related to each other in the same degree. Three main groups are easily distinguishable—(1) Frisian and Saxon, whose nearest relation is English; (2) Frankish, Hessian, and Thuringian; and (3) Alemannian and Bavarian. Frisian is generally considered as a separate language. From Saxon the later Low German dialects have sprung. The members of the third group (generally designated as *Oberdeutsch*, or Upper German), combined with *Mitteldeutsch*, or the midland dialects, viz., Thuringian, Hessian, and part of the Frankish dialects, are the sources of the later *Hochdeutsch* or High German. The greatest difference prevails between the first and third groups; the second may be characterized as containing various transition dialects. The southern Frankish dialects are very closely akin to the adjacent Upper German idioms, while Dutch, the utmost offshoot of the Frankish language to the north, does not very materially differ from Saxon or Frisian in the earliest period.

The German language presents, as do most of the cognate tongues, three main stages of development,—Old Middle, and Modern,—distinguished by their inflexional and literary character. In accordance with Mr. Henry Sweet's description of the stages of the English language, Old German may be defined as the period of *full* inflections, while the Middle period is that of *leveled* inflections, but it is chiefly the literary character that distinguishes Modern High German from Low German and its own earlier stages. A special form of High German is established in this period for all literary purposes, supplanting the dialects both of Low and of High German that formerly were freely used in literary intercourse. Assuming two periods of *transition* besides, we have the following divisions, with the approximate dates:

|                               |                |
|-------------------------------|----------------|
| Old High German.....          | to 1,050       |
| Early Middle High German..... | 1,050 to 1,150 |
| Middle High German.....       | 1,150 to 1,350 |
| Late Middle High German.....  | 1,350 to 1,500 |
| Modern High German.....       | 1,500 onward.  |

The same divisions have to be made for Low German, but the scheme cannot be so fully carried through, as the time between 1,000 and 1,200 is almost destitute of literary monuments.

*Old German.*—The inflexional characteristics of Old German are almost identical with those of Old English. Nouns had the same five cases,—nominative, accusative (only in a few instances kept distinct) genitive, dative, and instrumental. Strong and weak declensions of

nouns and their subdivisions, are likewise the same. **The dual of the first and second personal pronouns** is almost extinct in Old High German, but is quite common in Low German. In the verb we find the same distinction of the subjunctive from the indicative mood, and the same two inflected tenses, present and past,—the former also used for the future, the latter for all shades of past time. The order of the sentence corresponds generally to the modern use, but is not kept so strictly as now, especially in the oldest prose texts, which are often materially influenced by the Latin sources from which they have been derived or translated.

The earliest extant specimen of Low German belongs to the beginning of the ninth century. It is a short formula of renunciation of the devil to be used before the ceremony of baptism.

Much more numerous and various in age and dialect are the documents of Old High German, some of which date as far back as the eighth century. Welcome as they may be to the student of grammar, not much can be said for their intrinsic value. Almost all the prose pieces are mere translations (many of them could not be worse) from the Latin; and even such poetical works as Otfrid's *Life of Christ* are no more than prose thoughts forced into bad verse. Only a very few relics of true poetry have reached us, among which the *Hildebrandslied* (in a mixed dialect), the fragments of the *Muspilli* (a poem about the Last Judgment, in the Bavarian dialect, belonging, like the *Hildebrandslied*, to the beginning of the ninth century, and also written in alliterative verse), and the *Ludwigslied* (881 or 882, in one of the Frankish dialects) may be mentioned here.

The transition to Middle High and Low German is conspicuously marked by a decided improvement in the poetic faculties of the nation. While the tenth century has left only a very few specimens of poetry, and these of poor quality, the number of poems (mainly of a theological bearing) dating from the eleventh century is not inconsiderable, and the twelfth century shows a rapidity of literary development almost unparalleled. At first, indeed, religious and legendary poetry is still prevalent, but soon literature begins to take a more historical or epic turn. This tendency is clearly visible in the *Kaiserchronik*, or Emperor's Chronicle, in which the first attempt is made to give a survey of universal and German history in a poetical form. The romantic tales of Alexander the Great and of the battle of Roncesvalles were translated from the French—the *Alexanderlied*, by the Pfaffe Lamprecht, the *Rolandlied*, by the Pfaffe Konrad; while old national traditions contributed fitting subjects for such epic poems as that concerning the adventures of the Lombard King Rother. Lyric poetry, hitherto altogether neglected, sprang suddenly into vigor in the remote east of Austria about the middle of the century, and soon found its way to other countries. But the most decided advance was not made till about 1180, when the new forms of social life that had crept in among the more cultivated classes, in imitation of the laws and customs of French chivalry, began to exercise a powerful reforming influence on all branches of poetry. The example set by the Netherlands poet, Heinrich von Veldeke (who for some time lived, and partly wrote, in Germany), in his *Eneit*, or *Aeneid*, was soon followed by the three great epic masters of the period, Hartmann von Aue, Gottfried von Strasburg and Wolfram von Eschenbach. About the same time the *Nibelungenlied* and other compositions of a more national character were composed, while lyric poetry was raised to a height of excellence never attained at any other period of the Middle Ages, and represented in the songs of Walther von der Vogelweide. It was then for the first time that Germany possessed



real literary language, undoubtedly homogeneous as far as style and meter are concerned. Whether a similar unity of the outer form of speech had already been reached at that period is a point very difficult to decide.

In the fourteenth and fifteenth centuries the development of the dialects rapidly advanced.

While the fifteenth century was marked by great divergences of the spoken dialects, important steps toward gaining a greater uniformity of literary speech were made in the same period by the invention of the art of printing, and by the development of certain *Kanzleisprachen*, or literary idioms of the imperial or other chanceries. There is no need to explain how the habit of reading books printed in dialects not familiar to the reader must have obliged the learned public of the time to acquire a certain amount of knowledge of dialects in general, and must have made them better aware of the peculiarities of their own idioms than was either necessary or possible at the time when manuscripts written expressly in the local dialects of the readers were the only means of conveying literary information. Besides, writers as well as printers must soon have found it profitable to publish their works in a language readily understood by readers in all parts of the country. The principal work, however, was done in Germany by the chanceries. Among these the imperial chancery naturally held the most prominent position; and, inasmuch as its public acts were addressed to readers of all dialects existing throughout the empire, it obviously had also the greatest interest in calling into existence a general idiom. In the fourteenth century no difference between the language of the imperial chancery and the local idioms of the particular emperors was yet visible. The public acts of Louis of Bavaria (1314-1347) were written in the Bavarian dialect. The succession of Charles IV. (1347-1378) was accompanied by the introduction of the Bohemian dialect into the imperial charters. This dialect, as was natural from its local position, was neither purely Southern nor purely Midland. *Ei, ou, eu* for *i, ū, iu* were frequently adopted from the Southern dialects, but *ch* for *k* and *p* for *b* were generally rejected; unaccented vowels were preserved to about the same extent as in Midland German. In the reign of Wenceslaus of Bohemia (1378-1400) the same state of things was maintained; but in the charters of Rupert, the elector palatine (1400-1410), we find the Midland dialect of the Palatinate. Sigismund (1410-1437) reintroduced the Bohemian dialect, which by this time had, with the exception of a very short period, prevailed for nearly a hundred years in the imperial chancery. It was therefore but natural that Duke Frederick of Austria should exchange the Austrian dialect of his ducal chancery (which abounded with *kch, kh, kg* for *k* and *p* for *b*) for the Bohemian chancery dialect of his predecessors, when he succeeded to the imperial throne (1470-1493). His example was followed by Maximilian (1493-1519), but only so far as public acts were concerned. In charters destined for local Austrian use as well as in his private correspondence he always kept his vernacular Austrian dialect, showing thus that no change of the spoken idioms had been caused as yet by the introduction of the new artificial language. In the same manner and at the same time the Midland dialect of the electoral chancery of Saxony came to be better adapted for general use by the adoption of the Southern *ei, ou, eu* for *i, ū, iu*, and the abolition of several prominent Midland peculiarities.

In the preceding paragraph we have tried to give a short sketch of the origin of literary Modern High German; and it is this very idiom of the imperial and Saxon chanceries that Luther made afterward popular by his translation of the Bible.

Luther's language, again, was soon acknowledged by German grammarians, as Sebastian Franck (1531) and Johannes Clajus (1578), and was accordingly imitated as the best pattern of High German. It is true that in the sixteenth century many writers, especially in Switzerland and Lower Germany, still clung with great pertinacity to their native dialects. But about 1600 Luther's language was fully established as the only idiom of literary intercourse throughout Germany. The changes the language has undergone since Luther's time mostly concern the inflexional system.

The varieties of the German dialects of the present are too numerous to be described here. It may suffice to state that the old divisions of Low German, Midland, and Upper German dialects are still applicable.

*German Literature.*—There is a deep vein of poetry in the Teutonic nature, and it appears to have revealed itself in the earliest ages. Unfortunately hardly a trace of the songs in which the old Germans, as Tacitus tells us, celebrated their gods and heroes, has come down to us. Of the rhythm in which these primitive conceptions were embodied, we have no certain knowledge, but as the most ancient poems which have been preserved are in alliterative verse, it is reasonable to assume that this had grown up long before writing had come into use.

When the German tribes began to accept Christianity the clergy everywhere opposed the native poetry. Among the Goths of the fourth century Bishop Ulfilas took the most effectual means of achieving his purpose by preparing a clear, faithful, and simple rendering of the Scriptures,—a translation which since proved of the highest value in the scientific study of the Teutonic languages.

Charles the Great was the first to check the hostile movement against pagan compositions. He showed his love of his native speech, not only by beginning to put together a German grammar, but by issuing orders for a collection of old German poetry. These treasures of old High and Low German literature are nearly all lost. Of the works with which the church sought to counteract pagan influences also very few remain, among them the *Heliand*, a Low German poem in alliterative verse. It is a narrative of the life of Christ, said to have been written by a Saxon at the request of Louis the Pious. During the reign of Charles the Great and Louis the Pious secular learning was zealously cultivated in the monasteries, Fulda and St. Gall especially distinguishing themselves. From the time of Otto I. the Germans stood in direct relation with Italy; the marriage of Otto II. with the Princess Theophano brought them in connection with the learning and refinement of the Byzantine court; and Gerbert, the friend of Otto III., afterward Pope Sylvester II., introduced them to some of the achievements of Arabian science.

The reign of Henry IV., during which the struggle between the empire and the papacy began, had a disastrous effect on the national culture, and the evil was not remedied under the disturbed rule of his two immediate successors. But under the Hohenstaufen dynasty, during the period of Middle High German, the country passed through one of the greatest epochs of its literature. The more learned of the clergy interested themselves deeply in the development of scholasticism; and in the thirteenth century Albertus Magnus, a native of Swabia, produced the first systematic exposition of Aristotle, in the full light of Arabian research. It was, however, in poetry that Germany achieved the highest distinction, and her most important poets were members of the knightly class. The most characteristic outcome of this active era is the series of poetical romances produced in the twelfth and thirteenth centuries.



Heinrich von Veldeke is the first of the poets who may claim to rank as German *trouvère*. Hartmann von Aue, in *Der Arme Heinrich*, and other poems, selected themes that are rather repulsive to modern feelings, but he was endowed with plastic force, and interests us touching certain mystical aspects of mediæval sentiment. The master in whom these aspects were most fully represented was Wolfram von Eschenbach, whose chief poem, *Parzival*, was composed toward the end of the twelfth century. A complete, almost dramatic contrast to Wolfram, is found in Gottfried of Strasburg, the greatest of his literary contemporaries. Gottfried's theme is Tristram and Isolt; and the charming tale, which unfortunately he did not live to carry to an end, was perhaps never more beautifully told. The best known of Gottfried's imitators is Conrad von Würzburg, who wrote on the Trojan war and many other subjects. Toward the end of the thirteenth century the movement showed signs of exhaustion, and romances began to make way for rough popular tales and rhymed chronicles.

Fortunately the poets of the age of chivalry did not all occupy themselves with the subjects of French romances. A few, whose names have been forgotten, turned toward the rich material in the metrical legends of their native land. Of these poets the most important was he who collected and put into shape the *Nibelungenlied*, (q.v.) The Germans justly regard this epic, which often has been compared to the *Iliad*, as one of the most precious gems of their literature. *Gudrun* is another epic in which a poet of this period gave form to several legends.

The age of chivalry was remarkable not only for its romances and epics, but for its lyrics. All the leading writers of the time exercised themselves in lyrical poetry, and it was laboriously cultivated by multitudes who did not feel equal to the task of a prolonged effort. Among those who gained more or less distinction may be named Heinrich von Morungen, Reinmar der Alte, and Gottfried von Neifen. The poets of this class were known as *Minnesänger*, because their favorite theme was Minne, or love. Of all the minnesänger the first place belongs without question to Walter von der Vogelweide. Besides the usual themes of the lyrical poetry of his time, he wrote with enthusiasm of his native land; he also frequently alludes to the strife between the spiritual and secular powers and sternly rebukes the ambition of the papacy.

Several of the *minnesänger*, Walter von der Vogelweide especially, display at times a strongly didactic tendency. From the beginning of the period this tendency was developed by writers who took little interest in poetry for its own sake, and it became more and more prominent as the purely lyrical impulse passed away. The didactic poet, however significant his labors may be to his contemporaries, has necessarily the stamp of commonplace for posterity; and the gnomic writers of the thirteenth century form no exception to this rule. Among the didactic writers of the period, Freidank stands foremost, who in his *Bescheidenheit* expresses so high a conception of duty, and expresses it so well, that the work was ascribed to Walter himself.

In this age also we find the first serious attempts to secure for German prose a place in the national literature. The *Sachsenspiegel* and the *Schwabenspiegel*, two great collections of local laws, mainly interesting because of their social importance, had considerable influence in encouraging the respect of the Germans for their own language. The preachers, however, were the principal founders of prose style. Brother Berthold, a Franciscan monk, a man of noble and commanding temper, and an orator of the highest rank, is the most prominent representative of those clergymen, who, dissatisfied with the

technicalities of scholasticism, strove to attain to a fresh vision of religious truth, and to kindle their own enthusiasm in the minds of others.

When, after the fall of the Hohenstaufen dynasty, the age of chivalry came virtually to an end, the muse of poetry found a refuge in the large cities, which, in the meanwhile, had risen to a position of higher importance than they had ever before occupied. Unfortunately the burghers had no literary training; they were not familiar with any great models; and the character of their daily employment was not such as to kindle thoughts that demand poetic utterance. They treated poetry almost like a trade, which had to be learned like any handicraft. Literature produced under such conditions could not have much vitality, and there is hardly a *meistersänger* whose name is worthy of being remembered.

Much more important than these tedious manufacturers of verse were the unknown authors of the earliest attempts at dramatic composition. The beginnings of the modern drama were the crude representations of scriptural subjects with which the clergy strove to replace certain pagan festivals. These representations gradually passed into the "Mysteries," or "Miracle Plays." Along with them grew up what were known as "Shrove Tuesday plays," dialogues setting forth some scene of noisy fun, such as a quarrel between a husband and wife, with a few wise saws interspersed. Hans Rosenblüt and Hans Folz, both Nuremberg *meistersänger*, were prolific writers of such plays.

By far the most important writers of the fourteenth century are the mystics, like Johannes Tauler, of Strasburg (1300-61), and Heinrich Suso, of Constance (1300-65). They are chiefly of importance in the history of speculative thought, but even from the point of view of literature, they were of high service in the development of a rich, vigorous prose.

During the latter part of the fifteenth century there was in Germany, as in other leading European nations, a great revival of intellectual life. And this was due to the same causes as prevailed elsewhere, especially the rediscovery of Greek literature and the invention of printing. It is surprising how many books found their way to the public between 1450 and the outbreak of the Reformation. Of this great mass of literature, a comparatively small proportion was created in obedience to the free impulses of the intellect. The problems of the time were mainly social and practical; men were less moved by ideal interests than by questions as to the tyranny of the princes, the greed and sensuality of the clergy, the worldliness of the papacy, the powerlessness of the crown to enforce peace and order. Multitudes of little tales in prose and verse appeared in which the princes, the nobles, the clergy, and sometimes rich citizens were held up to ridicule. By far the greatest of these satirical writings was the epic narrative *Reineke Vos*. The stories of *Reynard the Fox* and *Isengrim the Wolf*, probably belong to prehistoric ages. They became current, through the Franks, in Lorraine and France, and from the eleventh to the fifteenth century they formed the subject of many works in Latin, French and German. The epic to which allusion is now made appeared in 1498, and was probably by Hermann Barkhusen, a printer of Rostock. It is in low German, and its materials were obtained from a prose version of the tale which had appeared some years before in Holland, and of which Caxton printed an English translation. There are several renderings of the poem into high German, the most important being the well-known work of Goethe. Another popular satirical work was the *Narrenschiff* (Ship of Fools) of Sebastian Brandt, published in Basel in 1494. A satirist of bolder type was Thomas Murner, a preacher, who both in sermons



and secular writings attacked without mercy the classes who were the butts of his fellow-satirists. *Tyll Eulenspiegel*, a book published in 1519, deserves mention as it was once a great favorite, though the jokes it contains are mostly coarse and vulgar.

Behind the strife and noise of contending sections there was slowly growing up an admirable intellectual product of Germany—its popular poetry. One of the earliest writers who struck the note of the popular poets was Veit Weber, a Swiss who fought with his countrymen against Charles the Bold, and who celebrated in vigorous verses the battles of Grundson, Murten and Nancy. From this time the German people had always a living poet of their own, created by unknown authors, but caught up by the masses, passed on from village to village, till it was everywhere known, and handed down by each generation to its successor.

Luther (1483–1546), by his translation of the Bible, for the first time gave the nation a literary language. Up to this stage every author had written in the dialect with which he was himself familiar; henceforth for the men of Swabia, of Bavaria, of Saxony, and of all other districts there was a common speech, which the writers of each State could use without any sense of inferiority to those of another. It is thus to Luther, who also enriched the literature of the nation by some excellent hymns, that the Germans owe the most essential of all the conditions of a truly national life and literature. The writer who deserves to stand next to Luther is Ulrich von Hutten (1488–1523). An accomplished humanist, he effectually attacked the enemies of the new culture in the *Epistolæ Obscurorum Virorum*, of which he was one of the chief writers.

His German writings are mainly short satirical poems and prose dialogues and addresses. A far more voluminous author than Hutton or Luther was Hans Sachs, meistersinger of Nuremberg (1494–1567). He was, indeed, one of the most prolific German writers, having composed, according to his own calculation, more than 600 poems. Although extremely popular in his own time, Sachs was almost forgotten after his death. His memory was revived by Wieland and Goethe, and he is now universally admitted to have been the chief German poet of the sixteenth century. If Hans Sachs was the most industrious poet of the age, Johann Fischart was, beyond all comparison, its greatest satirist. He was an enthusiast for the Reformation, and did it more lasting service among the middle class than half the theologians. His chief work was an adaptation of Rabelais' *Gargantua*, which he rendered with an insight into its purpose, and a fullness of sympathy with its methods, unsurpassed even by Urquhart. Among other cultivators of prose style deserving mention are Albert Durer, Johann Thurnmeier, called Aventinus (1466–1534), Sebastian Frank (1500–45) and Ægidius Tschudi of Glarus (1505–72). The latter three wrote histories ranking considerably above mere chronicles. Huldreich Zwingli, the Swiss reformer (1484–1531) could state an argument with logical precision, but his style is thin and weak in comparison with the nervous force of Luther.

During the century the drama made considerable progress. Besides the *Mysteries* and *Shrove Tuesday Plays*, school comedies, in imitation of Plautus and Terence, were written and acted in the universities and public schools. Luther encouraged these comedies, and was, indeed, friendly to dramatic efforts of all kinds. When the Jesuits began to agitate in opposition to Protestantism they detected at once the importance of this element in popular life; and through their influence more attention was paid, not only to the plays, but to the manner in which they were represented. About the middle of the century a theater was built in Nuremberg,

and Augsburg and other cities soon followed the example.

The period at which we have now arrived is, in many respects, the most dismal in German history. From 1618–1648 the country was desolated by the Thirty-Years' War, and such were the effects of this bloody struggle upon German literature that it almost vanished, and even the language itself became so corrupt and intermingled with foreign elements as to render it almost unfit for the expression of any elevated thoughts. Still there were some writers even in this dark period who accomplished some good work, especially in religious lyric. Paul Gerhardt (1606–75) wrote hymns that are admired in our own days. He had worthy associates among the Protestants in Johann Rist (1607–67), Joachim Neander (1610–88), and Louise Henrietta Brandenburg, wife of the Great Elector (1627–67). Some of the Jesuits also attempted the lyrical expression of religious feeling; and one of them, Friedrich von Spee (1592–1635), fell little short of the best among his Lutheran rivals.

The beginnings of modern German poetry are often dated from the publication of Martin Opitz's (1597–1639) critical book, *Die deutsche Poeterei*, which appeared in 1624, and enjoyed great popularity. In regard to merely outward form, it deserved its reputation, for Opitz was the first German writer who attempted sharply to distinguish the different species of poetry, to bring together some of the external laws which govern them, and to insist with emphasis that purity of style is essential to high literary effect. Opitz was born in Silesia, and from this circumstance the writers who shared his tendency or came under his influence are known as the first Silesian school. Paul Fleming (1609–40) was the principal lyrical, and Simon Dach (1605–59), a gifted sentimental poet of this school.

While the admirers of Opitz were striving to introduce a correct poetic style, a movement of a very different kind originated among the Pegnitzschäfer of Nuremberg. The members of this society, conscious of the barrenness of existing poetry, and not feeling in themselves the sources of higher activity, turned for help to Italian literature. Instead of studying the great Italian poets, however, they attached themselves to Marino and his extravagant school, and the chief result was a number of fantastic pastorals, the writers of which seemed to have no other aim than to show how much silly affectation the German language may be made to express. Their tendency was carried to its utmost development by the second Silesian school, at the head of which stood Hoffmannswaldau (1618–79) and Loenstein (1635–83). They in their turn were opposed by Canitz, the Berlin statesman and poet (1654–90), Besser (1654–1729), and König (1688–1744), most of whom were court poets, who endeavored to imitate the then fashionable verses of Boileau, but were unable to resist the success of Lohenstein's affected and extravagant effusions. One of the characteristic traits of the Germans' imitativeness was especially conspicuous during this period, and was the bane of literature in Germany, only a few, as Brockes of Hamburg (1680–1747) and Günther (1695–1723), were free from it, while Neukeirch (1655–1729) and especially Wernicke of Hamburg (died about 1720), were almost the only poets who dared to protest against it. The most entertaining book of the seventeenth century was a collection of tales of adventure, *Simplicissimus*, by Grimmelshausen, a style of composition in which he had been preceded by the satirist Moscherosch. The writings of the Roman Catholic preacher Abraham a Sancta Clara (1642–1709) are distinguished by a broad humor, especially his *Judas der Erzscheim*, (Judas the Arch-Rogue), still his humorous



passages are marred by a far larger number in which he is pedantic or vulgar. No progress was made during the seventeenth century toward the formation of a national drama. For a time it almost seemed as if Germany could never hope to emerge from the intellectual degradation into which she had sunk, but in reality the higher forces of the nation were rallying in preparation for a new era. One of the first symptoms of revival was presented by the remarkable pietistic movement, which, although it ultimately led to the formation of the pettiest of petty sects, was in its origin noble both in aim and in method. Jacob Spener (1633-1705) and August Hermann Francke (1663-1727) were its originators, whose labors not only gave more sincerity to religious forms, but did service to literature by quickening the popular intellect, and awakening emotions which could find no satisfaction in the tedious writings of the day. Of still greater importance were the beginnings of modern German philosophy. It was in this dreary period that Germany gave birth to one of the most brilliant of her thinkers, Leibnitz (1646-1716). He was the first to lay a scientific basis for the study of philosophy in his native country, but his works he wrote chiefly in Latin or French, being disgusted with the prevailing style of the day. Wolf (1679-1754), his disciple, shaped the views of Leibnitz into a comprehensive system, and published his works in the German language. Christian Thomasius (1655-1728), an impressive popular thinker, edited the first German periodical, a sort of monthly magazine in which he vigorously attacked pedants and bigots. The seventeenth century closed with the foundation of the Berlin academy by Leibnitz.

The symptoms of a revival now became more and more numerous, and received a sudden impulse by the appearance of a great warrior and statesman in Germany. Frederick the Great profoundly affected the intellectual life, not only of Prussia, but of the whole empire. He restored to the people the faith in their own vigor; he convinced them that it depended on themselves whether or not they should rise to their ancient place in Europe; and by the prompt, faithful and energetic discharge of his personal duties he set before them an example which was widely felt. Literature shared the impulse which penetrated the national life. The general tendency was for reform in education, in literature, and soon for reform in all departments of thought. Gottsched in Leipsic (1700-1766), laboring in the same direction as Thomasius, exerted himself to make the German language the sole medium of instruction, and published in it manuals and abridgments of philosophy and science. He advocated the classical rules of composition of Racine and Corneille, but aimed above all at correctness. He, unfortunately for his fame, was a pedant of the worst kind; his views brought him into conflict with Bodmer (1698-1783) and Breitinger of Zürich (1701-76), who were admirers of Milton, and defended the claims of free poetic impulse against Gottsched's arbitrary laws of conscious art. They carried on a paper war in their respective journals, until at length many who had rallied round Gottsched became disgusted with his pedantry, and, separating themselves from him, established a periodical celebrated in German literature under the name of *Bremer Beiträge*, edited by Gärtner (1712-91) in which they opposed their former friend; at the same time they formed a poetical union to which Hagedorn was friendly, although he did not join it, but which was eventually joined by Klopstock, who became its most illustrious member. Among the contributors to this journal were Rabener (1714-71), a clever though somewhat tame satirist; Zachariä (1726-77), a writer of poetry in imitation of Pope's "Rape of the Lock;"

Gellert (1715-69), an amiable moralist and writer of fables and religious songs; Kästner, distinguished by his biting epigrams; Giseke; Johann Elias Schlegel, dramatist, and Johann Adolph Schlegel (1721-93), poet; Fuchs, Cramer Ebert, translator of Young's *Night Thoughts*, and several others. The journal was printed in Bremen, but the poets resided for some time at Leipsic, whence they adopted the name of the second Saxon school, while the followers of Bodmer (of Zürich) style themselves the Swiss school. Related to the latter was the school of Halle, to which belonged Lange, Pyra, Uz, and Götz. The most distinguished of the poets of this school were Kleist (1715-59), the soldier-poet who was fatally wounded on the battle-field of Kunersdorf, author of descriptive and picturesque poetry in the manner of Thompson and Pope, and Ramler (1725-98), a composer of spirited odes, in Horatian meters, which like the *War Songs of a Grenadier* of Gleim (1719-1803) gave pleasure because of their strongly patriotic tone—the direct result of both cases of Frederick's influence. Gleim was one of the most kindly of men, and became the patron of young poets, who always found a willing and liberal helper in him. Anna Louisa Karsch (1722-91), a poetess who owed much to Gleim's goodness, was a favorite among the literary men of the day. Solomon Jessner of Zürich (1730-87) gained in his time a high reputation as a writer of idyls. He was imitated by Xaver Bronner, whose idyls have not half the merit of his autobiography, which affords remarkable insight into the religious life of Catholic Germany in the middle of the eighteenth century. Of greater influence than any of the poets yet named were Hagedorn of Hamburg (1708-54), whose fables and songs rendered him famous in Germany, and Albrecht von Haller (1708-77), the illustrious Swiss physiologist and savant, who was remarkable as a writer of descriptive and didactic poetry.

Important as were many of these writers, they exercised slight influence on the national mind compared with the three men whom the Germans justly regarded as the founders of their classical literature—Klopstock (1729-1803), Wieland (1733-1813), and Lessing (1729-1781). Klopstock stood in direct relation to the Swiss writers. When a pupil at Schulpforte, one of the great Saxon schools, which sent forth many of the best authors of the day, he was a diligent student of Bodmer, by whose critical principles he guided himself in reading Homer, Virgil and Milton. The *Messiah*, on which his fame mainly rests, is now little read. Notwithstanding its obvious defects, however, it has qualities which must still command admiration. Klopstock's odes, which he continued to write from the beginning to the end of his long career, are of higher excellence. Although Klopstock was one of the central literary figures during two generations, he was not a prolific writer; Wieland, on the other hand, was one of the most prolific of German authors. Of his many works the romantic poem *Oberon* is by far the most famous, and the only one that really pleases modern readers. He had a fine appreciation of style, and by the study of Greek and French masterpieces persistently strove to acquire lightness, clearness and ease. Even yet few German writers will compare with him in these qualities.

Whatever may be the excellences of Wieland and Klopstock, both are essentially writers of the past. This cannot be said of Lessing, the third great German of this period; he is still a living influence. He did for German literature what Luther did for the German language. He established a new school of criticism, and struck a final blow at Gallic influence, at the same time that Frederick the Great was coquetting with the French graces. His tragedy *Emilia Galotti*, his comedy *Minna von Barnhelm*, and his philosophical drama



*Nathan der Weise*, are models of dramatic composition. Valuable as were Lessing's imaginative creations, they were surpassed by his labors as a thinker. Here he was absolutely supreme among his contemporaries; and in some respects he has not since been surpassed. As a master of style he ranks with the greatest European writers. The greatest of Lessing's purely critical writings is *Laocoön*, a fragment, but a fragment containing the germs of much of the best thought of his own and the immediately succeeding generation. It has an enduring value as the first serious and great attempt to distinguish sharply the realms of art and poetry, and to foster both by subjecting each to its own laws. Next in importance stands his *Hamburgische Dramaturgie*, a series of profound and philosophical criticisms on plays represented at the Hamburg National Theater. In his later years he issued the *Wolfenbüttel Fragments*, portions of a theological work by Reimarius, a deistical writer of force and clearness. He thus became involved in a hot controversy with indignant professors and pastors, the noisiest of whom was Pastor Goetze of Hamburg. The tracts issued by Lessing in the course of this controversy are in form the most perfect of his writings; they are at once learned, keen and witty. In his *Education of the Human Race* he gave systematic shape to the fruitful principle that a religion which is not true absolutely or for all time may be of vast importance by meeting the needs of a portion of a race in special epochs, and that there is in history, notwithstanding apparent reactions, a progressive movement toward higher intellectual and moral ideals.

Thus, in all directions, the great writer labored for the intellectual regeneration of his people. If Goethe, Schiller and Kant found a nation prepared to receive their works they owed the fact to many causes, but among these the chief was the political activity of Frederick II., and the literary activity of Lessing.

Shortly after Lessing had begun to edit the *Literaturbriefe*, a new influence was introduced into the literary world by Herder (1744-1803), who, while at Königsberg, became acquainted with Hamann and Kant, and who was known as a scholar as early as 1762. He brought to bear upon literature an almost universal knowledge, the study of the poets of all nations, an intimate acquaintance with Hebrew, Greek and Latin writings, and above all a cosmopolitan humanitarian spirit, which, together with his poetical genius, manifested itself most suggestively in the crowning work of his life, *Ideen zur Philosophie der Geschichte der Menschheit*. He contributed powerfully to promote the study of Oriental poetry, and was the first to call attention to the beauty of the ancient popular songs of different nations, and particularly of his own. Another great impulse was given by Winckelmann (1717-68). His examinations of the remains of ancient art and his writings modified all the old theories of the beautiful, and by his efforts the spirit of art and poetry was brought back to the genuine and simple taste of the Greeks. Heine, the accomplished critic and commentator, propounded the theories of Winckelmann at Göttingen, then the most brilliant university of Germany. The young men there became deeply impressed with the new theories, and under the influence of the reforms which were then initiated in religion, philosophy, literature, art and education founded in 1770 the *Musen Almanach*, a literary journal, and not long afterward a poetical union known as the *Göttinger Dichterbund* or the *Hainbund*. Klopstock became the leader and model of these enthusiastic youths, whose aim was to give a new stimulus to poetic emulation and to oppose to conventional theories a school of poetry founded upon the inspiration of genius and humanity. Among the members of the union were Bürger (1748-

94), the author of *Lenore* and other ballads and songs; Voss (1751-1826), one of the most learned philologists of his days, immortalized by his translations of Homer and Virgil; Hölty (1748-1776), whose songs became very popular; the two Stolbergs, who coöperated with Voss in familiarizing the Germans with the ancients, and who excelled in various kinds of metrical composition; Claudius, Miller, Hahn, Cramer, Gotter and Boje. A genial poet of this period was Pfeffel (1736-1809), whom it would be difficult to class with any particular school.

Goethe (1749-1832), already known to fame, came forward in 1773 with *Götz von Berlichingen*, which created an entirely new period in dramatic literature. In 1774 appeared *Werther's Leiden*. The reformatory period of literature was now over. The revolution set in, or the *Sturm-und-Drangperiode*, as it was called after a drama of that name by Klinger (1753-1831), whose high-wrought tragedies and novels, as well as the writings of Schubart (1739-91) reflect most forcibly the excitement of this epoch. In the meanwhile Schiller (1759-1805) produced his *Räuber*, followed by *Fiesco* and *Cabale and Liebe*. These impassioned tragedies gave a new impetus to literary excitement. His *Don Carlos*, however (1784), shows greater moderation, and opens a long series of tragedies in which the highest aspirations for liberty and humanity are interwoven with historical associations, expressed in language of the most classical purity. But it was only after Schiller's union with Goethe (1795), that by their combined efforts German literature was brought to that classical perfection which, from a purely national, has since given it a universal influence. Schiller, by his enthusiastic and sympathetic eloquence and tenderness, became the favorite of the people; and Goethe, with his all-embracing intellect and boundless sensibilities, controlled by a strong will, incased in a body of exuberant health, and disciplined by lofty culture and knowledge, became the acknowledged sovereign of German literature.

While Goethe and Schiller were in the midst of their career, Europe was startled by the French revolution. At first it stirred as much interest in Germany as in England. The aged Klopstock welcomed it with odes full of the fiery energy of youth, and for a time Schiller almost fancied that his loftiest hopes were about to be realized. But the ensuing Reign of Terror soon transformed sympathy into bitter opposition; and when Germany was trodden under foot by Napoleon, she turned more and more from every kind of French influence.

An event of the highest importance in the intellectual growth of Germany was the publication, in 1781, of Kant's *Kritik der Reinen Vernunft*. Its effect on philosophy was not unlike that caused in our own days in science by Mr. Darwin's *Origin of Species*. Schiller became one of Kant's most enthusiastic students, and traces of the new system are to be found in many of his later lyrics and dramas. By-and-by, dissatisfied with the gulf left by Kant between mind and matter, as "things in themselves," philosophers started in search of some principle which should harmonize all the elements of existence; and thus grew up, one after the other, the systems of Fichte, Schelling, and Hegel. Philosophical writers of great eminence also were Herder, Moses Mendelssohn, and Hamann. In a popular style wrote Engel, the author of *Lorenz Stark*, and the psychological novels of Jacobi are among the more suggestive of German prose writings. Among other prose writers are Reinhold and Barth, Alexander Gottlieb, Baumgarter, Meier, and Sulzer. Abbt, Garve, Liscow, the philosopher and elegant fabulist; Lavater, the physiognomist; his friend Zimmermann, and his sarcastic opponent Lichtenberg; the historians Duhm, Möser,



Schröckh, Schlözer, and Beck; Spittler, the noted Göttingen historian; Moshinn, the ecclesiastical historian; Johannes von Müller, the historian of Switzerland, one of the classical historiographers of Germany (1752-1809); Georg Forster, the teacher and friend of Alexander von Humboldt, an admirable writer; the publicist Friedrich Karl von Moser; the educator Basedow, and afterward Pestalozzi; Campe, the writer of books for children; Nicolai, Lessing's friend and author of the satirical novel *Sebalduß Nothanker*; Adelung, the philologist; Bottiger, the antiquary; Sturz, the biographer; Reimarus, Jerusalem, Spalding, Rosenmüller, and Ernesti, in theology; Eichhorn in theology, in universal and literary history; Blumenbach, Bloch, Herschel, Euler, Vega, and many other eminent writers in various branches of learning and science, belong to this period. A writer who stood quite alone in his idiosyncrasies was Jean Paul Richter, usually called Jean Paul (1763-1825). It is difficult to do justice to Jean Paul, for he commits almost every fault of which a writer of romance can be guilty, yet it is impossible even to look into any of his innumerable books without recognizing his genius. The work which has maintained the strongest hold over the nation is perhaps his charming prose idyl, *Die Flegeljohre*, but his great romance, *Titan*, and the less ambitious *Siebenknecht* have also kept their place as works of permanent excellence.

The most important literary movement which originated during the lifetime of Goethe was that of the Romantic school, whose aim was to assert for modern feeling the right of a freer, more varied utterance than can be provided for it by the forms of classical literature. The Romanticist delighted in drawing pictures of the middle ages, of the charms of chivalry, and of oriental life. The chief writers whom they opposed to the classical poets, both of antiquity and of modern times, were Shakespeare and Calderon, but they brought to light many mediæval authors who had previously been neglected, and stimulated the Germans to a systematic study of the whole of their past literature. The writer known as the prophet of the Romantic school was Friedrich von Hardenberg, generally called Novalis (1772-1801), while its critical leaders were the brothers August Wilhelm von Schlegel (1767-1845), and Friedrich von Schlegel (1772-1829), the former distinguished for his masterly translation of Shakespeare, the latter for his *Ancient and Modern Literature*. The period in which the brothers worked most effectually for their school was between 1796 and 1800, when they lived in Jena, and formed the center of a brilliant circle, which included Fichte, Schelling, Tieck and Wilhelm von Humboldt. Here they edited the *Athenæum*, in which they chastised feeble and pretentious writers and awoke general interest in mediæval art and literature, and in the systems of philosophy that harmonized with their special tendency. The most productive, and, for a time, the most famous writer of the Romantic school was Ludwig Tieck (1773-1853). A writer of less importance, but who exercised considerable influence over Tieck at an early period of his career, was H. R. Wackenroder (1772-98). He was the first to enlist the sympathies of the German artists for the æsthetic principles of the Romantic school. La Motte Fonqué (1777-1843) achieved, in his little book, *Undine*, a masterpiece. This charming tale, with its sweetness, pathos and dreamlike beauty, is now above criticism; it has taken its place as one of the select class of creations which appeal to all the world, and do not depend for their popularity on the tendencies of a particular time. Other Romanticists who deserve mention are E. T. A. Hoffmann (1776-1822), Clemens Brentano (1777-1842), Achim von Arnim (1781-1831). Joseph von Eichen-

dorff (1788-1857), whose lyrics combine the depth of emotion of the popular song with clear and musical expression, is an adherent of the Romantic school only in some of his tales. Adalbert von Chamisso (1781-1838), although usually classed as to some extent a Romanticist, has none of the dreaminess and mysticism of the school. The most distinguished dramatist of the school is Heinrich von Kleist (1776-1811). Allied to the Romantic school, although not directly connected with it, were the writers of the so-called fate tragedies. The originator of this curious class of works was Werner (1768-1823), and he found followers in Müllner and Honwald. The fate tragedy stuck for a time to the popular fancy, although it would be difficult to imagine a more trivial conception of fate than that which is developed in Werner's *Twenty-fourth of February*. Even Kotzebue, who, together with Iffland (1759-1814), had been for many years in possession of the stage, came under its influence. Kotzebue (1761-1819) was a most prolific writer; and, although he had no imagination, and wrote merely to catch the applause of the moment, his comedies still deserve to be named among the few works of this class which have hitherto been produced in Germany.

Among favorite novelists of the period are J. T. Hermes (1738); Hippel (1741-96); Musäus (1735-87), the author of a collection of *Volksmärchen*, or popular fairy tales; Blumauer, J. G. Müller, and Thümmel, (1738-1817), the author of a novel in imitation of Sterne's *Sentimental Journey*; Jung-Stilling (1740-1817), the inspired tailor, in whose naïve and original autobiography Goethe, Schiller and Herder took so much interest; Knigge (1752-96), the author of the *Reisenach Braunschweig*; and Immermann (1796-1840), the author of the famous story of *Münchhausen*.

The love of the Romantic writers for previous epochs of German history and literature led to the great researches of the brothers Grimm, who founded the scientific study of the German language and of German antiquities. They were followed by many devoted scholars, among whom may be named Beneke, Lachmann, Moritz Haupt and Franz Pfeiffer. The oriental studies of the Romanticists also promoted comparative philology, which acquired something of the character it now bears through the labors of the illustrious scholars, Wilhelm von Humboldt and Franz Bopp. During the calamitous period when Germany was humbled by Napoleon the Romantic school, by continually recalling the past glories of the nation, contributed largely to the revival of patriotic feeling. In the war of liberation the popular excitement was expressed with great spirit by the young soldier poet Theodor Körner (1791-1813), and the patriot Ernst Moritz Arndt (1769-1860). It was as a writer of patriotic war songs that Friedrich Rückert (1789-1866) opened his career. Afterward he moved over a wide range, distinguishing himself especially as a translator of Oriental poetry, where he showed an unsurpassed mastership over the language.

With Ludwig Uhland (1787-1862) the so-called Swabian school of poets came into existence. Uhland ranks with the greatest of modern lyrical writers. He is truly popular and patriotic in tone, yet his songs and ballads have an ease and grace of style which raise him far above the romantic school. Other Swabian poets were Justinus Kerner and Edward Märke. The theater was dominated by Raupach (1784-1752) and Freiherr von Auffenberg (1798-1857). One of the best of imitators of Walter Scott, whose influence at this time began to be felt in Germany, was Wilhelm Hauff (1802-1827); Wilhelm Häring, known as Willibald Alexis (1798-1876), also was influenced by the



great Scotch novelist. Johanna Schopenhauer, mother of the philosopher, was considered in her day an attractive writer of romance. She was surpassed by Caroline Pichler (1769-1843), who wrote several well-known historical novels.

With the death of Goethe in 1832 began a new era in German literature, an era not yet closed. In 1848 the national aspiration for freedom and unity found decisive expression in action; since that time Germany has achieved unity by the sword, while she still slowly feels her way toward freedom. It was inevitable that in such an epoch much of the best energy of the nation should be devoted to politics, but there has also been deep literary activity.

From 1818 till his death in 1831, Hegel dominated the highest thought. Among his followers who distinguished themselves are Arnold Ruge, who applied Hegelianism to politics; David Friedrich Strauss, who in his memorable *Leben Jesu*, resolved the narratives of the gospels into a series of myths; Feuerbach, who, going still farther, warred against all religion, and argued that it should be replaced by a sentiment of humanity. Schelling, Herbart, Sotze, Krause, Ubrice and the younger Fichte also claim our notice as philosophers of the different Hegelian schools; none of the names, however, have the importance which attaches to that of Arthur Schopenhauer, who, although his chief book was written in the lifetime of Goethe, did not secure a hearing till long afterward. At the present time he stirs deeper interest than any other thinker. Eduard von Hartmann, the latest original thinker of Germany, works on essentially the same lines, but seeks to reconcile Schopenhauer not only with Hegel and Schelling, but with Leibnitz.

The growth of science has been one of the most powerful factors in the recent development of Germany. Among books presented in a popular form the result of scientific labor, Alexander von Humboldt's *Cosmos* still holds the first place. Liebig, Virchow, Helmholtz, Buchner, Vogt, also made admirable attempts to render subjects intelligible and interesting to ordinary readers. Of historians Leopold von Ranke, Gervinus, Droysen, Dahlmann, Häusser, Waitz, Mommsen, Curtius, and Sybel are the most eminent. Of late years much attention has been devoted to *Culturgeschichte*, which describes the life of a people in all its phases, either through the whole part or during a particular epoch. A favorable example of works of this class is Karl Biedermann's *Germany in the eighteenth century*. Since the time of Lessing esthetics have always formed a prominent branch of philosophy among the Germans, and they have hardly been less successful as historians of art than as historians of metaphysics. High distinction has been achieved, among other art historians, by Kugler, Vischer, Carrière, and Lübke. Of historians of literature there is almost a small army, and not less vast is the amount of biographical literature. No German writer since Goethe and Schiller has excited so much interest throughout Europe, as Heinrich Heine. He professed to care little for what men said of his poetry, yet it is mainly as a lyrical poet that his name lives. His *Buch der Lieder* is one of the most fascinating collections of lyrics in European literature. In his prose, which deals with a wide range of subjects, he is rather French than German in his love of sparkling epigram and wit. The combination of pathos, wit and humor in his writings gives him a unique place in the literature of his country.

Platen, who belongs rather to the previous period, was one of the many writers whom Heine bitterly attacked, but he was a poet of considerable power, and of a lofty, manly character. His odes and sonnets are

in a language and meter so artistically finished as to rank among the best classical poems of modern times. Börne was another writer whose fame suffered from Heine's satire. He was a manly literary critic, and, as a political writer, dealt at the despotic government of Germany blows they keenly felt.

A school of writers known as "Young Germany," was deeply influenced by Heine, and had the good fortune to be singled out for persecution by the confederate diet. Their object was to effect a complete revolution in the political and social institutions of Germany, and at the same time they became the propagandists of ideas intended to undermine the church. The most important member of the school was Karl Gutzkow, who wrote a number of dramas which maintain their hold on the stage. He was also the author of many romances, of which the chief were *Die Ritter vom Gieste* (The Knights of the Mind), and *Der Zauberer von Rom* (The Magician of Rome). Heinrich Laube, Gustav Kühne, Theodore Mundt, and Ludolf Wienborg belong to the same school.

The novel has acquired the same important place in Germany as in France and England. One of the most distinguished of recent novelists is Gustav Freytag, whose chief work, *Soll und Haben* (Debit and Credit), is a study of Commercial life, intensely realistic in tendency. Important historical romances have been written by Levin Schücking, who is remarkable for his power of vividly conceiving character. The countess Ida Hahn-Hahn, is the writer of a number of novels; she is surpassed by Fanny Lewald, one of the best German novelists. Among other female authors that reached high distinction in most recent times are Eugénie John, best known as E. Marlitt, and Elizabeth Büstenbender, who writes under the *nom de plume* of Victor Werner. Paul Heysé's short tales have firmness of outline and are at the same time full of delicate grace; as a writer of elaborate romance, he also achieved success. The humor of Hackländer is generally considered to surpass that of any recent writer; and among the novelists of simple village life Auerbach takes the first place, Friedrich Spielhagen has penetrated deeply into the spirit of the age, and in *Problematische Naturen* (Problematic Natures), and other works, reveals its tendencies with cultivated imaginative force. The novels of Fritz Reuter, although written in Low German, take high rank.

Contemporary literature has not been divorced from the stage. Besides Gutzkow and Laube, Gottschall has been a fertile writer, both of tragedy and comedy; Freytag, also Prutz, are original dramatic authors. Other dramatists are Grabbe, Hebbel, Friedrich Halm, Mosenthal, Paul Lindau, Adolf Wilbrandt, Charlotte Birch-Pfeiffer, and Roderich Benedix.

Many recent writers have attempted lyrical and narrative poetry, some of them with sufficient power to maintain worthily the traditions of German literature. From about 1830 onward a group of Austrian poets commanded the respect of all Germans. The chief was Count von Auersperg, better known as Anastasius Grün. The Hungarian Nicholas von Strehbna, generally called Lenau, gives powerful utterance in several poems to the sorrows of a deeply melancholy nature. Meisener and Hartmann, Bohemian poets, have a considerable reputation. Leopold Schefer's *Laienbrevier*, is interesting because of the contrast it presents to the pessimist tone of more recent writers. Before the revolutionary movements of 1848 a number of writers attempted to force poetry into the service of freedom. Of these one of the best known is Herwegh. The interest of his writings is rather historical than literary. Ferdinand Freiligrath was of



a more truly poetic temperament. His poems have graphic force, and in his earlier writings he displayed a remarkable talent for reproducing the gorgeous colors of tropical landscape. Hoffmann von Fallersleber and Franz Dingelstedt also deserve mention here. The lyrics of Emanuel Geibel have found favor with nearly all classes. Among the most distinguished contemporary writers is Robert Hamerling, whose poetry is remarkable for the boldness of its conceptions and its almost vehement passion. Since the middle of the eighteenth century Germany has never been without writers of deep thought and vast research, and in her supreme writers—in Lessing, Goethe, Schiller, and Heine—these qualities have been associated with a feeling for artistic finish which has not been surpassed in England, or even in France.

GERMERSHEIM, a fortified town in Rhenish Bavaria, the chief town of a circle, is situated at the confluence of the Queich and the Rhine.

Germersheim existed as a Roman stronghold under the name of Vicus Julius. The citadel was rebuilt by the Emperor Conrad II., but the town itself was founded in 1276 by the Emperor Rudolph I., who granted it the rights of a free imperial city. He died in Germersheim in 1291.

GERMS, a name applied to the egg-cell of plant or animal, either from the first or in its early stages; but also used in reference to micro-organisms associated with disease, (see BACTERIA, etc.) By "germ-cells" the reproductive elements, especially the ova, are meant; while "germ-plasma" is a very common modern word for the most essential parts of the nuclei in the reproductive cells.

GERM THEORY OF DISEASE, as the name implies, seeks to find the explanation of certain well-recognized conditions of disease in the presence and action of specific living organisms within the affected body. Though comparatively recently introduced as an efficient working hypothesis in the investigation of some hitherto ill-understood pathological phenomena, the correctness of the theory is now generally admitted. The facts which it has aided in establishing and the numberless investigations which it has inspired have created an important department of medical science. The study of bacteriology (see BACTERIA) has awakened fresh interest in almost every branch of medicine; and the subject possesses a large and extensive literature of its own.

The evolution of the theory was due mainly to two factors: (1) The discussions and investigations which circled round the process of fermentation; (2) the application of more perfect microscopical methods to the study of the lowest forms of plant and animal life.

(1) The familiar process of FERMENTATION (*q.v.*) gave birth to much debate. The earlier chemists (Gay-Lussac, and more recently Liebig) held that fermentation was merely the result of the process of decay of organic matter. Various modifications of this doctrine, which cannot be considered here, were enunciated, but the general conclusion remained the same. On the other hand, so early as 1812, Appert had demonstrated from the practical side that organic substances capable of fermentation or putrefaction could be preserved intact if kept in closely stoppered bottles which were afterward exposed to the temperature of boiling water. In 1836 Caignard-Latour described an organism, the yeast plant, which he affirmed to be constantly present in the fermenting fluid. Its growth and reproduction he believed to proceed synchronously with the fermentation. Schwann (1837) described this organism independently, and Helmholtz (1843) confirmed the observation. They maintained that the process, in place of being a mere decomposition, was vital and depended on the presence

of the organism they had discovered. This revolutionary doctrine was further elaborated preëminently by Pasteur and by Schultz, Schroeder, Dusch, Lister, Tyndall, and others. Their researches showed that fermentation was caused by the presence of these organisms; that the exclusion of these from fluids capable of fermentation by various methods of sterilization and filtration of the air in which they were abundantly present, was sufficient to prevent its occurrence; that the doctrine which attributed the production of fermentation to the influence of certain gases—*e.g.*, oxygen (Gay-Lussac)—was erroneous; that the idea of the spontaneous generation of such organisms within properly sterilized and protected fluids (Needham, Bastian, Pouchet, Huijzinga) was fallacious; and that the so-called putrefaction was but one variety of fermentation.

(2) One result of these discussions was to develop a refinement of the methods of microscopical research, more especially with reference to the investigation of the lowest forms of life. Though bacteria had been recognized and described in the seventeenth century (Leeuwenhoek), it is mainly to the researches of the latter half of the nineteenth century that we are indebted for an approach to an accurate knowledge of the life-history of these organisms. By the masterly labors of Cohn, De Bary, Zopf, Van Tieghem, Nägeli, Klebs, Koch, and many others, the methods of demonstration have been improved to an extraordinary degree. The elaboration of staining methods alone, in conjunction with the use of perfected lenses, has made possible the detection and examination of minute organisms which have hitherto been unrecognizable.

It is impossible to say when the idea of an analogy between the familiar phenomena of fermentation and those of acute disease first arose. It is certain that before the nineteenth century there had been prevalent an ill-defined feeling after something of the kind. More than 200 years ago Robert Boyle (1627–91), in his *Essay on the Pathological Part of Physik*, clothes the idea in words which, as Tyndall has said, "have in them the forecast of prophecy." The idea received more definite formulation in consequence of the researches into the nature of fermentation referred to. In 1848 Fuchs stated that he had discovered bacteria in animals which had died of septicæmia. In 1850 it was announced (Davaigne, Branell, Pollender) that bacilli had been detected in the carcasses of animals affected with anthrax. The discovery was corroborated by various observers. But it was not till the disease had been induced by the inoculation of healthy animals with a minimal quantity of the organism (Davaigne) that the *Bacillus anthracis* was recognized as the cause of the disease. Thus was afforded the first substantial proof of the germ theory. This success inspired further research on kindred lines. In comparatively quick succession other discoveries were announced, till, in 1882, Koch described the *Bacillus tuberculosis* as the organism responsible for the scourge of consumption, and in 1883 the bacillus of cholera.

Emphasis must be laid on the statement that the discovery of an organism in the circulation or tissues of a diseased animal cannot be accepted as proving the causal efficacy of the former. Apart from further experiment, it were perfectly fair to argue that such organism was a mere accompaniment of the morbid state, flourishing on the dying or diseased tissues. And, in fact, such secondary factors are recognized. It has, moreover, frequently happened that competing claims have been advanced in explanation of the same disease. It was necessary, therefore, that there should be formulated (Klebs, Koch) certain conditions, since known as Koch's postulates, which must be fulfilled by an organism whose causal relationship with a given disease is main-



tained. These are as follows: (1) The organism must be demonstrated in the circulation or tissues of the diseased animal; (2) the organism, so demonstrated, must be capable of artificial cultivation in suitable media outside the body, and successive generations of *pure cultivation* obtained; (3) such pure cultivation must, when introduced into a healthy and susceptible animal, produce the given disease; (4) the organism must again be found in the circulation or tissues of the inoculated animal. The claims of organisms which fail to meet these demands must be set aside to await further proof.

The number of diseases whose specific origin is now generally admitted is comparatively large, but of few of these can we speak with the same certainty as may be done regarding consumption (tuberculosis) and splenic fever (anthrax). In other words, the fulfillment of all four postulates by many of them has not been demonstrated or has been disputed. Besides anthrax and tuberculosis, the list includes leprosy, cholera (Asiatic), relapsing fever, typhoid fever, yellow fever, malaria, diphtheria, dysentery, syphilis, acute pneumonia, gonorrhea, septicæmia, erysipelas, actinomycosis, etc. With considerable probability we may add whooping-cough, measles, scarlatina, typhus, smallpox, hydrophobia, tetanus, British cholera, etc.; but the evidence regarding these and others is defective, and, in some cases, less substantive than analogical.

The specific organisms associated more or less exactly with those diseases are members of the groups (a) *Coccaceæ* and (b) *Bacteriaceæ*.

The admission that certain diseases are due to the presence and action of specific living organisms raises the further questions: (1) How do they enter the body? (2) How do they act?

(1) How do they enter the body? It has been conclusively shown that the *Bacillus tuberculosis* may obtain access by the inhalation of germ-laden air, by the ingestion of affected milk and possibly of tubercular meat, perhaps, too, through a cut or sore. It seems also likely that the bacilli may be transmitted from mother to foetus by way of the circulation. Similar lines of attack may be predicated of all the pathogenic organisms. Notably, in connection with wounds, it is important to bear in mind the possibility of infection with the germs which induce septicæmia—a fact on which was based the great advance in surgery associated with the name of Lister.

The possibility of infection varies much according to the conditions of growth of the particular organism and the receptivity of the host. This explains, on the one hand, the popularly accepted view that certain diseases are much more infective than others. Thus, typhoid fever differs widely from scarlatina in respect of degree of contagiousness.

On the other hand, some persons undoubtedly are more susceptible to the attacks of certain organisms. Thus, among the subjects of tuberculosis, it is probable that preparedness of soil plays an important part in the production of the disease. And so with other pathogenic organisms. These processes have their analogy in the more common phenomena of vegetable life. Sow some seeds and they will germinate and grow on any soil, however unlikely. Other seeds may be scattered profusely, but will not develop, unless the soil has been carefully prepared and the other conditions of growth be fulfilled. It is impossible to enter here on the discussion of those conditions. Necessarily they vary much with different organisms. But it is important to realize the extreme value, from the therapeutic point of view, of their careful study. The first step to a rational treatment of such diseases is to *know* the responsible organism. This knowledge must include not

only its shape and other physical characters, but the life-history of the microbe, and the conditions which assist or retard its development and reproduction. Such knowledge affords the only sound basis for a system of *preventive* medicine, which constitutes one of the most important departments of practical hygiene. Although still in its infancy, the preventive treatment of endemic, epidemic, and other contagious diseases has now become scientific.

(2) How do the organisms act? This is a much-debated question. It has been the subject of some of the most valuable of recent researches in this department. Do they act mechanically as irritants? Or is their action privative, by stealing from the tissues elements which are necessary to their development? Or have they a power of elaborating (or secreting) new products, which exert a toxic influence on the affected body? This last view is supported by weighty evidence and by the analogy of the fermentation processes already referred to. It would therefore seem that the microbe has the power of disturbing—or rather that, in order to the preservation of its own life, the microbe is compelled to disturb—the molecular arrangement of the elements in the medium in which it is developing. The products thus elaborated have been termed *Ptomaines* (*Ptōma*). They were so named by Selmi, who discovered their presence in the dead body during various stages of putrefaction.

The ptomaine doctrine has been accepted in explanation of the process of septicæmia, and there is good reason for extending its application to the other infective processes. It is essential, however, to remember that, after the microbe has succeeded in invading the tissues, its further progress is not unopposed. There is a constant warfare between the living cells of the host and the living and multiplying cells of the invader, the contest being decided in favor of the stronger. The researches of Metschnikoff and others seem to show that the bacilli can be destroyed by the white corpuscles of the blood.

Granted that the organisms have entered the tissues or circulation, there still remain for the physician two modes of attack: (a) by attempting to exterminate the microbe itself through such agents as may be discovered to be possessed of germicidal properties; (b) by endeavoring to antagonize the poison which the microbe is distributing through the system. Many difficulties attend both methods, inasmuch as agents sufficiently potent to effect either object are themselves likely to prove injurious to the infected tissues. The aim of *curative* medicine is the discovery of remedies capable of preventing the growth of the microbe, yet innocuous to the host.

Reference must be made, in conclusion, to the question of immunity. It is well ascertained that certain animals are not susceptible to the attacks of certain pathogenic organisms, and that others suffer comparatively slightly. In man there may be traced the occurrence of individual immunity. Such facts have not yet received a satisfactory explanation. The almost universal immunity after a first attack of certain fevers and the comparative immunity from smallpox conferred by *VACCINATION* (*q. v.*) are of interest in this connection. The experiments of Pasteur and others on *Bacillus anthracis* indicate that by repeated cultivation under special conditions it is possible to lessen the virulence of the most virulent of organisms and that inoculation with this altered bacillus confers immunity against further attack. More striking still are the experiments of Pasteur in connection with rabies. By a special method that observer has accomplished an attenuation of the virus—the microbe not having been determined—whereby the



worst features of the disease are disturbed. By this means it has been found possible in cases of infection to anticipate a serious attack by the introduction of this modified virus. In explanation of this it has been supposed that a poisonous ptomaine is generated during the process, which, when injected in quantity during the stage of incubation of the disease, prevents the development of the supposititious germ. Those and other kindred observations disclose a most hopeful development of the germ theory in the direction of preventive inoculation.

GERONA, a city of Spain, the chief town of the province of Gerona (one of the four into which Catalonia was divided), is situated about fifty-four miles northeast of Barcelona, on the railway to Perpignan, in France, near the junction of the Ter and Oña. At present Gerona is a comparatively insignificant place, although it numbers about 15,000 inhabitants.

Gerona is the ancient *Gerunda*, a city of the Ausetani. It boasts that it is the place in which St. Paul and St. James first rested when they came to Spain; and it became the see of a bishop about 247. For a considerable period it was in the hands of the Moors, and their emir, Soleiman, was in alliance with Pepin about 759. It was taken by Charlemagne in 785; but the Moors regained and sacked it in 795, and it was not till 1015 that they were finally expelled. At a later date it gave the title of count to the king of Aragon's eldest son. In May, 1809, it was besieged by the French, with 35,000 troops, under Verdier, Augereau, and St. Cyr; forty batteries were erected against it, and a heavy bombardment maintained; but under the leadership of Mariano Alvarez it held out till famine and fever compelled a capitulation on December 12th. The French, it is said, had spent 20,000 bombs and 60,000 cannon balls, and their loss was estimated at 15,000 men killed and wounded.

GERRHA, an ancient city of Arabia Felix, on the west side of what is now the Persian Gulf, described by Strabo as inhabited by Chaldaean exiles from Babylon, who built their houses of salt, and repaired them by the application of salt water.

GERSE, a department of France, composed of the whole or parts of the five old districts of Gascony, viz., Armagnac, Astarac, Lomagne, Comminges, and Condomois. It is bounded north by the department of Lot-et-Garonne, east by Tarn-et-Garonne and Haute-Garonne, south by Hautes-Pyrénées and Basses-Pyrénées, and west by Landes. It is about seventy-two miles in length from east to west, and fifty-three in breadth from north to south. This department is hilly, particularly in the south, where it is mostly covered with ramifications of the Pyrenees. There is seldom any snow, and there is scarcely any frost. More than half of the department is arable; about one-seventh is occupied by vines, and the rest is meadows, wood, or heath. The soil is not of great fertility, but is tolerably well cultivated, and the grain produced is more than sufficient for home consumption. About one-third of the wine produced is used for home consumption, and the remainder is chiefly manufactured into brandy, known by the name of Armagnac. The amount of brandy distilled in the department annually is about twenty-two million gallons. Gers is divided into the arrondissements of Auch, Lectoure, Mirande, Condom, and Lombez, with twenty-nine cantons and four hundred and sixty-seven communes. The chief town is Auch. The total area is 2,425 square miles, and the population is 283,546.

GERSON, JOHN, one of the most eminent scholars and divines of his time, was born at the village of Gerson, in the diocese of Rheims, December 14, 1363,

his proper name being Jean Charlier. He was educated in Paris, at the college of Navarre, under the celebrated Peter D'Ailly. Here he rose to the highest honors of the university, and ultimately to its chancellorship, having acquired by his extraordinary learning the title of Doctor Christianissimus. He was a clear and rational theologian, an enemy to scholastic subtleties, while his reason found rest from all its difficulties in a devout Christian mysticism. During the unhappy contests which arose out of the rival claims of the two lines of pontiffs in the time of the Western schism, the university of Paris took a leading part in the negotiations for union; and Gerson was one of the most active supporters of the proposal of that university for putting an end to the schism by the resignation of both of the contending parties. With this view he visited the other universities, in order to obtain their assent to the plan proposed by that of Paris. But, although he had the satisfaction of seeing this plan carried out in the Council of Pisa, it failed, as is well known, to secure the desired union. In a treatise inscribed to his friend D'Ailly, he renewed the proposal that the rival pontiffs (now not two, but three, since the election of John XXIII. at Pisa) should be required to resign; and in the new council held at Constance, in 1414, he was again the most zealous advocate of the same expedient of resignation. But his own fortunes were marred by the animosity of the duke of Burgundy and his adherents, to whom Gerson became obnoxious, and from whom he had already suffered much persecution on account of the boldness with which he had denounced the murder of the Duke of Orleans. To escape his vengeance he was forced to remain in exile; and he retired from Constance, in the disguise of a pilgrim, to Rattenberg in the Tyrol, where he composed his celebrated work, *De Consolatione Philosophiæ*. It was only after the lapse of several years that he was enabled to return to France and take up his residence in a monastery at Lyons, of which his brother was the superior. He devoted himself in this retirement to works of piety, to study, and to the education of youth. The only fee he took from his pupils was a promise to repeat the prayer, "Lord have mercy on thy poor servant, Gerson." He died July 12, 1429, in his sixty-sixth year. His works fill five volumes in folio (Antwerp, 1706). The famous treatise on the *Imitation of Christ* has been ascribed to him by some writers, but it is now hardly doubtful that the true author was Thomas à Kempis. The authority of Gerson is much relied on by the advocates of Gallican principles; but the Ultramontanes allege that the principles laid down by him as to the authority of the Pope are only applicable to the exceptional case in which he wrote, viz., that of a disputed succession, in which the claim of each of the rival popes, and therefore of the existing papacy itself, was doubtful. See the studies by Charles Schmidt (Strasburg, 1839), and Schwab (Wurzburg, 1858).

GERSONIDES, or BEN GERSON, LEVI, a distinguished Jewish philosopher and commentator, was born at Bagnolo, in Languedoc, toward the close of the thirteenth century, probably in 1288. He is believed to have died at Perpignan in 1370. Part of his writings consist of commentaries on the portions of Aristotle then known, or rather of commentaries on the commentaries of Averroes. Some of these are printed in the early Latin editions of Aristotle's works. His most important treatise, that in which he has a place in the history of philosophy, is entitled *Millhamoth Adonai* (The Wars of God), and is said to have occupied twelve years in composition.

GERSTÄCKER, FRIEDRICH, who enjoyed a most extensive popularity as a novelist and a writer of travels



both at home and abroad, was born at Hamburg in 1816.

He traveled in 1837 on foot over all parts of the United States, working as he went for his bare subsistence, and then settled for some time in Arkansas, where he led the life of a roving sportsman. Only now and then he visited inhabited places to see civilized society, and to earn some means by whatever work he could obtain. Thus he went in 1842 to Point Coupée in Louisiana, where he undertook the management of a hotel. This time, however, he did not return with the acquired means to the backwoods, but repaired to his German home to see his mother and other relatives, after having led an adventurous life for six years and a half. On his return to Germany he found himself, to his great surprise, known as an author, on a limited scale at least. His mother had shown his diary, which he regularly sent home, and which contained descriptions of his adventures in the New World, to the editor of the *Rosen*, who readily published them in his periodical. The traveling sketches having found great favor with the German public, Gerstäcker issued them, in 1844, in a collected form, under the title of *Streif- und Jagdzüge durch die Vereinigten Staaten Nordamerikas*. His next literary labors consisted of translations from the English, during the performance of which it occurred to him that he might himself become an original author, since he was able to delineate original characters, to relate remarkable occurrences, and to describe romantic scenery from his own experience, whilst others were obliged to draw upon their imagination only in producing works of fiction. Accordingly Gerstäcker issued, in 1845, his first novel, *Die Regulatoren in Arkansas*, and henceforth the stream of his productiveness flowed on uninterruptedly. In 1849 he again repaired to America, being this time provided with a grant from the then "German Government," and acting at the same time as correspondent to the *Augsburger Allgem. Zeitung*. After having made very extensive travels both in America, Polynesia, and Australia, he returned in 1852 to Leipsic. In 1860 his innate restlessness drove him to South America, chiefly with a view of inspecting the German colonies there. After having traversed nearly all the principal South American countries, he returned to Germany, but for a short time only, for in 1862 he accompanied the Duke Ernest of Coburg-Gotha to Egypt and Abyssinia. This was his last great journey, after the return from which he lived first near Gotha and then at Brunswick, where he died on May 31, 1872.

GERVAIS, PAUL (1816-1879), an eminent palæontologist, was born in September at Paris, where he obtained the diplomas of doctor of science and of medicine, and in 1835, as assistant to De Blainville in the laboratory of comparative anatomy at the Museum of Natural History, commenced palæontological research. Gervais was remarkable for the disinterestedness with which he devoted himself to the cause of science.

GERVAISE OF CANTERBURY, born about 1150, was one of the monks of the priory of Christ Church, Canterbury, and witnessed the burning of the cathedral in 1174. He is known as a trustworthy chronicler of English history.

GERVASE, or GERVAISE, of Tilbury (*Gervasius Tilburiensis*), an English Latin writer of the thirteenth century, was probably born at Tilbury in Essex.

GERVINUS, GEORG GOTTFRIED, one of the most eminent literary and political historians of Germany, was born 1805, at Darmstadt. In 1826 he went to Heidelberg, where he attended the lectures of the great historian Schlosser, who became henceforth his guide and his model. From 1828 to 1830 he held a mastership in a private institution at Frankfort-on-the Main,

issuing at the same time, in conjunction with Morstadt and Hertlein, a comprehensive edition of Thucydides, and writing an essay on Bloomfield's English translation of the Greek historian. In 1830 he returned to Heidelberg, and wrote among other essays one on Probert's *Ancient Laws of Cambria*. The year 1832 he spent in Italy as traveling tutor to a young Englishman, and on his return to Heidelberg he wrote several historical treatises, which he issued in 1833, in a collected form, as the first volume of his *Historische Schriften*. In 1837 he wrote his *Grundzüge der Historik*, which is perhaps the most thoughtful of his philosophico-historical productions. Gervinus, in 1848, took refuge among his literary and historical studies, more especially devoting himself to the study of Shakespeare, the result of which was his great work *Shakespeare* (1849-1850), in four volumes. He also revised his *magnum opus*, the *History of German Literature*, for a fourth edition (1853), and began at the same time to plan his *History of the Nineteenth Century*, which was to be a continuation of the *History of the Eighteenth Century*, by his guide and teacher, Schlosser. With unwearied energy he devoted himself to his above-mentioned great historical work, *Geschichte des neunzehnten Jahrhunderts seit den Wiener Verträgen*, which he issued in eight volumes, the first in 1855, and the last in 1866. He founded, and liberally supported, the Handel Society in Germany, whose object it was to restore the compositions of the great master in an authentic form, and to issue German versions of the texts suitable to the compositions. The result of his Handel studies was his critical and æsthetical work, *Händel und Shakespeare, zur Ästhetik der Tonkunst* (1868). He died rather suddenly, March 18, 1871.

GESENIUS, FRIEDRICH HEINRICH WILHELM, one of the greatest of German Orientalists and Biblical scholars, was born at Nordhausen, February 3, 1786, studied at Helmstedt and Göttingen, and at Halle in 1810 became extraordinary, in 1811 ordinary, professor of theology. Here he lectured for more than thirty years, broken only by the closing of the university during the war of liberation (1813-14), and by lengthened visits to France and England in 1820, to England and Holland in 1835. Among his pupils were Von Bohlen, Hoffmann, Hupfeld, Rödiger, Tuch, Vatke and Benfey. He died October 23, 1842. His first great work was his *Hebräisches u. Chaldäisches Handwörterbuch* (1810-12; 10th ed., revised by Muhlau and Volck, 1886; English translation by Tregelles, 1846-52). His *Hebr. Elementarbuch*, consisting of the *Hebräische Grammatik* (1813; 24th ed. by Kautzesch, 1885), and the *Hebräisches Lesebuch* (1814; 11th ed., by Heiligstedt, 1873), have contributed enormously to the knowledge of the Hebrew language, not only in Germany, but through the translations also in England and America. Later works are his *Kritische Gesch. d. Hebr. Sprache u. Schrift* (1815), *De Pentateuchi Samaritani Origine, Indole, et Auctoritate* (1815), *Grammatisch-kritisches Lehrgebäude d. Hebr. Sprache* (1817), and a new translation of and commentary on Isaiah (1820-21). His greatest work is the monumental *Thesaurus philologico-criticus Linguae Hebraicae et Chaldaicae Veteris Testamenti*, of which the first part was published in 1829, but which was completed only in 1858 by Professor Rödiger. Many of the results of the rationalizing method of interpreting the Old Testament, which characterizes all the works of Gesenius, have been unable to stand the test of modern Biblical science. He has certainly been surpassed by Ewald in insight into the genius of the Hebrew language, and its bearing on the interpretation of Hebrew life and thought, as well as in all that qualifies the critic for a true historical, æsthetical, and



religious appreciation of the literature preserved to us in the Old Testament. Yet his intense devotion to his favorite studies, and the advance which he made beyond all his predecessors in the establishment of more certain principles of Hebrew philology, undoubtedly entitle him to be regarded as having constituted a new epoch in the scientific study of the Old Testament. A fine sketch of his life was published at Berlin in 1843.

GESNER, KONRAD VON, a Swiss naturalist, sometimes called the German Pliny, was born at Zurich, March 26, 1516. All his life long he was passionately devoted to the pursuit of knowledge, especially knowledge of the natural sciences. His early studies in medicine, natural history, and Greek and Latin literature, were prosecuted at Zurich, Strasburg, Bourges and Paris. Returning home in 1535, he earned his living by teaching, until, in 1537, he was appointed professor of Greek at Lausanne. This chair, however, he exchanged four years later for that of Physics and Natural History at Zurich, where he taught and practiced as a physician until his death, on December 13, 1565. He was also an indefatigable writer of books, and in the course of his life published no less than seventy-two works, besides leaving at his death eighteen others in progress. His *Bibliotheca Universalis* (1545) contained the titles of all the books then known in Greek, Hebrew, and Latin, unpublished as well as published, with criticisms and summaries of each; its second part, *Pandectarum sive Partitionum Universalium Libri XXI.*, came out in 1548-49. His next undertaking, by far the greatest of his literary works, was the *Historia Animalium* (1551-58). The first book treats of viviparous quadrupeds, the second of oviparous animals (tortoises, lizards, etc.), the third of birds, and the fourth of fishes and aquatic animals. The other books, never completed, were to have contained the history of serpents and insects. In this work, which will ever remain a monument of his untiring industry, he aimed at bringing together all that was known in his time concerning every animal. But botany was probably the section of natural history with which he had the greatest practical acquaintance. He had collected more than five hundred plants undescribed by the ancients, and was arranging the results of his labors in this department for a third *magnum opus* at the time of his death. He appears to have been the first who made the great step toward a scientific classification of distinguishing genera by the fructification. He also wrote on other branches of science, as medicine and mineralogy, and composed a great number of works dealing with the ancient classics, the *Mithridates sive de Differentiâ Linguarum* (1555), being the most notable. See Hanhart's *Konrad Gesner* (Winterthur, 1824).

GESSNER, SALOMON, Swiss painter and poet, and once a very favorite and widely-read author, was born at Zurich, Switzerland, April 1, 1730. His landscape paintings are all in the conventional classic style, but his engravings are of considerable merit. He died March 2, 1788.

GESTA ROMANORUM ("the deeds of the Romans"), the title of a collection of short stories and legends, in the Latin tongue, widely spread during the middle ages, but of the authorship of which little is known save that it took its present form more likely in England, about the end of the thirteenth or the beginning of the fourteenth century. The stories are invariably moralized, and in fact the edifying purpose throughout is the sole unifying element of the collection. The title is only so far descriptive as the nucleus of the collection consists of stories from Roman history, or rather pieces from Roman writers, not necessarily of any greater historical value than that of Androcles and the lion from Aulus Gellius. Moralized mystical and religious tales, as well

as other pieces, many of ultimate Oriental origin, were afterward added, and upon them edifying conclusions hung but awkwardly, bringing the whole up to about 180 chapters. Oesterley supposes its origin to have been English; the claims to its authorship of the Benedictine prior at Paris, Petrus Berchorius (died 1362), or of a certain Helinandus, may safely be set aside. The style and narrative faculty displayed deserve but little commendation, but the book has a unique interest as at least the immediate source of many stories that have filled a large place in literature. It is enough to mention the stories "Of Feminine Subtlety" (120), retold in verse by Hoccleve; "Of the Coming of the Devil, and of the Secret Judgments of God" (80), the Story of Parnell's *Hermit*; "Of Women, who do not only betray secrets but lie fearfully" (125); the story of the sixty black crows, the foundation of Doctor Byrom's clever poem, *The Three Black Cows*; "Of too much pride, and how the proud are frequently compelled to endure some notable humiliation" (59); a story of the Emperor Jovinian, the same as that of King Robert of Sicily, as versified by Longfellow; "Of the Transgressions and Wounds of the Soul" (102), the same as "The Leech of Folkstone" in the *Ingoldsby Legends*; "Of Mental Constancy" (172), a version of the romance of Guy of Warwick; and "Of Ingratitude" (25), and "Of Constancy" (66), together supplying the ground work of Rossetti's poem, *The Staff and Scrip*. Here also may be found what are substantially the same stories as Chaucer's *Man of Lawes Tale*, and Shakespeare's *King Lear* and *Merchant of Venice*. One tale "Of the Game of Schaci" (166), is a somewhat obscure description of the game of chess. The longest story, "Of Temporal Tribulation" (153), is that of the adventures of Apollonius of Tyre, his wife and daughter, as in Gower's *Confessio Amantis*, and in *Pericles*. Gower, however, took it from the *Pantheon* (end of the thirteenth century) of Godfrey of Viterbo. Enough has been said to show that great part of the stories belong alike in form and substance to the ancient story stock of Europe, and hence the book must be studied side by side with the romance of *Barlaam* and *Josaphat*, the *Disciplina Clericalis* of Petrus Alphonsus, the *Otia Imperialia* of Gervase of Tilbury, Voragine's *Golden Legend*, the *Speculum Historiale* of Vincent of Beauvais, and the medieval fables connected with the name of Æsop, no less than with such works of literary elaboration as the *Arabian Nights*, the *Talmud*, the *Fabliaux*, the *Decameron*, and the *Canterbury Tales*.

The stories in the *Gesta Romanorum* are mostly bald and inartistic, seldom, if ever, relieved by a touch of pathos or a gleam of humor, and never by any chance reaching the region of the really dramatic; yet they have a rare literary charm of their own in their utter naïveté and artlessness, as well as in the beautiful simplicity of their moralization, based on a piety that questions nothing or finds relief in an unfathomed mysticism. Some of the best stories are those that gird at the weaknesses or faults of women—a direction in which monkish wit was ever prone to turn.

The modern form of the *Gesta Romanorum* is, as has been said, a collection of 181 stories, first printed about 1473, but no MS. corresponding exactly to which exists. The first printed edition was issued at Utrecht in 150 chapters; the second forming the standard text, within 181 chapters, at Cologne. Although both of these are undated, Oesterley proves that their publication falls between 1472 and 1475. An edition in English was printed by Wynkyn de Worde (1510-15), from MSS. differing widely from those reproduced in the early printed Latin versions. Oesterley divides the num-



erous MSS. into three groups or families: (1) the English group written in Latin, the best representative of which has 102 chapters, of which seventy-two are found in the standard text; (2) the group of German and Latin MSS. represented by an edition printed in German at Augsburg in 1489; and (3) a group of MSS. represented by the standard text influenced by distinct collections of stories, as Robert Holkot's *Moralisationes Pulchræ in Usum Prædicatorum* and the like. The striking diversity between the MSS. in England and the printed collection led Douce to believe that there were two distinct collections of stories, one of German, and one of English origin. Oesterley's conclusion is that this *Gesta* was originally compiled in England, that it passed quickly to the continent and was there altered considerably before being printed, and that both the two first printed editions were compiled from several MSS. The second (the standard) formed the largest, and, reaching England before any of the native MSS. had been printed became accepted as the standard form for the printed text in spite of its many divergences from the MSS. that still existed.

An English version, by the Rev. C. Swan, was printed in two volumes, in 1824; in a revised form, by Wynnard Hooper, in Bohn's "Antiquarian Library," in 1877. Sir F. Madden edited *The Early English Versions of the Gesta Romanorum* for the Roxburghe Club, in 1838; Mr. Sidney J. H. Herrtage for the Early English Text Society, in 1879. Critical editions of the Latin text have been edited by A. Keller (Stuttgart, 1842), and H. Oesterley (Berlin, 1872), the last with a masterly introduction. See also the Dissertation in Warton's *History of English Poetry*, and in vol. ii., of Douce's *Illustrations of Shakspeare*; but these must not now be followed implicitly.

GESTATION, the retention of the mammalian embryo in the uterus. The period of gestation—*i. e.*, between the fertilization of the ovum and the extrusion of the foetus—varies greatly, from about 18 days in the opossum and 30 days in the rabbit to about 280 in man and 600 in an elephant. Robert Chambers, in his *Vestiges of Creation*, emphasized the importance of prolonged gestation as a factor of evolution, and it is certain that the more highly evolved mammals have longer periods of pregnancy than the lower. The size of the animal, the number of offspring at a birth, and the degree of their maturity at birth, have also to be considered; thus, the gestation of a cow and sheep last about 280 and 150 days respectively; those of mare and bitch about 350 and 60 days respectively; those of giraffe and kangaroo about 420 and 40 days respectively. In the marsupials, where the placental union between mother and offspring is still undeveloped, the birth is almost always very precocious; but in most cases the young are stowed away after birth in the external pouch. The lowest mammals—duckmole and Echivna—are oviparous.

GETA, PUBLIUS SEPTIMUS ANTONINUS, younger son of the Roman emperor Severus, was born at Milan, 189 A. D. Between him and his brother Caracalla there existed from their early years a keen rivalry and antipathy. On the death of their father in 211 they were, in accordance with his instructions, proclaimed joint emperors; and after the failure of a proposed treaty by which Caracalla was to retain Europe and western Africa, and Geta Asia and Egypt, Caracalla, on the pretense of a desire for reconciliation, arranged a meeting with his brother in his mother's apartments, and by means of assassins murdered him in her presence (212). His name was obliterated from all public inscriptions; all coins bearing his effigy were to be destroyed; and the use of

his name, either in conversation or in writing was forbidden under pain of death.

GETÆ, a people of Thracian extraction, who are first mentioned in history as dwelling on the right bank of the Danube, but who in the middle of the fourth century B.C. crossed that river and settled in Transylvania and Wallachia. They were conquered by Darius Hystaspes in 515 B.C. and then accompanied him in his campaign against the Scythians. Both Alexander the Great in 335 and Lysimachus, in 292 made attempts to subdue them, but neither was successful. During the first half of the first century B.C. they became politically united with the Dacians, a cognate race who had settled in their territories.

GETHSEMANE (Heb. *gath*, "a wine-press," and *shemen*, "oil,") the scene of our Savior's agony on the night before his Passion, was a small farm or estate at the foot of Mount Olivet, somewhere on the east slope of the Kedron valley, and rather more than half a mile from the city of Jerusalem. Attached to it was a garden or orchard, a favorite resort of Christ and his disciples. An enclosure with a few old olive-trees is now pointed out to travelers as the site of the garden.

GETTYSBURG, a small town in Adams county, Pa., is a manufacturing center of some importance, having flour mills, foundries, tanneries, etc. It has ample railroad, banking, and telegraph facilities, and is slowly, but steadily increasing in importance. It has a population (1890) of 3,180. The chief interest, however attaching to the town is in connection with the great battle fought there on July 1-3, 1863, between the Confederate forces under Gen. R. E. Lee, and the Union forces under Gen. George G. Meade, resulting in a Federal victory. Near the town are numerous monuments commemorating incidents of the battle.

From the beginning of the war up to the date of the battle of Gettysburg, the success of the Army of Northern Virginia, under its various commanders, had been uninterrupted, except in case of a few minor affairs—hardly to be dignified as more than skirmishes. McDowell had been met and defeated at Bull Run; McClellan, who had superseded him, had met his defeat at the outskirts of Richmond, the city he had boastfully undertaken to reduce in a short time; Pope had shared the same fate at the second battle of Bull Run; and McClellan had again failed to defeat Lee at Antietam. Burnside had been crushed at Fredericksburg, and "Fighting Joe" Hooker had been driven back from Chancellorsville across the Rappahannock, where he lay at Falmouth, opposite Fredericksburg. The position occupied by both armies, as they faced each other, being too strong to present any reasonable hope of successful attack, General Lee determined on a second invasion of Northern territory with the hope of drawing Hooker from his position and uncovering important points in his movements. As an initial movement he ordered General Ewell to move up the valley of Virginia and clear it of whatever Union forces there might be found. To execute this order Ewell proceeded at once, and having struck Milroy's command, forced that general to cross the Potomac. Ewell's advance up the valley was immediately followed by Longstreet and A. P. Hill, General Lee bringing up the rear in person. This movement had the effect of causing General Hooker to withdraw from before Fredericksburg and take up a position at Leesburg, between General Lee's army and Washington, which city was the object of his solicitude, it being imperatively necessary to cover it from attack. Meantime General Lee crossed the Potomac and marched into Pennsylvania, arriving at Chambersburg June 27th. General Lee, in the disposition of his forces,



had made the mistake of leaving General Stuart behind him to watch the movement of the Federal troops, and his lack of necessary information caused him to run unexpectedly upon General Meade's forces at Gettysburg. This blunder was due to the fact that General Lee had been led to believe, by the prolonged absence of Stuart, that the enemy instead of advancing to meet him in full force in Northern territory, were attempting to execute a counter-movement on Richmond by recrossing the Potomac and getting in his rear. In the meantime (June 28, 1863), General Hooker had been superseded by General Meade, who, contrary to Lee's belief, had pushed on to Gettysburg, instead of moving to the south, and on the evening of June 30, 1863, the advance guard of Lee's army encountered the Federals as above stated. This force, under General Heth, were under orders to make a reconnoissance in order to ascertain the strength of the enemy, and not to engage in a general action—in fact General Lee seems not to have suspected at first that it was the main body of the Federals he had encountered—but by the next morning it became apparent that a general engagement could not be avoided, and General Lee then hastened to bring up his troops and hurry forward all his reserves.

The situation of Gettysburg is in a depression between parallel ranges of broken ridges, which beyond the western extremity of the town flatten out in a plain. Here on the crest of the ridge to the west is the Lutheran seminary which gave name to the famous "Seminary Ridge," and upon this high ground General Buford, whose cavalry opened the fight, was posted on the morning of July 1st, at the same time guarding every approach to the town. The battle opened about 9 o'clock, Gen. A. P. Hill's division, with Heth's command in the lead, striking Buford's cavalry about a mile and a half from the town. Buford was slowly driven back, but was soon reënforced by Reynold's command. Wadsworth's and Doubleday's divisions, together with Robinson's division, followed in succession, and by 10 o'clock the various important points about the town were occupied by the Federal troops. Soon after, the Confederate General Archer lead the first charge against the Federals, striking Meredith's command, which occupied a position to the left of the Chambersburg road and extending southwardly to a small run or "branch." The charge was repulsed with heavy loss and Archer himself was captured. But in a short while A. P. Hill threw forward another assaulting party and Meredith was driven back. By 12 o'clock all of the first corps of the Federal army had reached the field, and was reënforced by a portion of the eleventh, numbering according to official reports, with Buford's cavalry, about 23,000, and these during the whole day bore the brunt of the battle, being opposed by a larger Confederate force, but were forced back through the town to the heights beyond—now known as the Cemetery ridge. During the night the scattered commands of both armies came up and all that night and until 4 o'clock the following day nothing of any importance transpired, the day being consumed by each army in the disposition of their forces for the desperate battle soon to follow.

Promptly at 4 o'clock the signal for attack was given and the Confederates, under Hood, advance, followed by McLaws. The Federal troops, after two hours' fighting, retired to Little Round Top, and here, amidst obstacles of every sort, was fought one of the bloodiest contests of the war. The Confederates were repulsed here, and the Federals occupied Big Round Top, securing Meade's flank from further danger. Meanwhile A. P. Hill's division had at first been successful in their assault on Humphrey's position, but at

last were driven back, and their repulse had left Meade's left safe, and enabled him to send the sixth corps to support the fifth, which was on Big and Little Round Tops. General Ewell, through some accident, did not get the signal to engage his command until it was too late for him to accomplish any good, and after a bloody battle between a portion of his troops and the Federals, which lasted till 9 P.M., the contest was adjourned till the next day. It was during the second day's fighting that General Gordon's brigade made their charge on Cemetery Hill. By 5:30 next morning the contest was renewed. From that time till 10:30 Slocum was the object of attack, but all to no purpose, and Johnson's Confederates were driven out of the barricades and trenches which they had taken from the Federals, and the former owners occupied them. General Lee tried by concentrated artillery fire to open a path for a charge by his troops by which means he hoped to carry the Federal position by assault. For this attack he chose a point between Little Round Top and Ziegler's grove. All along the line of this advance were stone walls and barricades, and behind these were posted Hancock's men. After a furious fire from the Confederate artillery Pickett's division at 2:30 P. M. rushed forward up the slope in its famous charge, but it was a useless sacrifice. Although a slight breach was made in the Federal lines momentarily, the damage was quickly repaired, and the battle was decided in favor of the Union forces. There was but little of importance done after this fearful charge, and in a short time Lee's shattered forces were in retreat toward Virginia. The total Confederate losses (disputed) are said to be 26,000; total Federal losses, 23,000. Among the Confederate wounded were Major-generals Hood and Heth, Brigadier-generals Semmes, Barksdale, Kemper, Anderson, Pettigrew and Scales. Confederate killed: Major-general Pender, Brigadier-generals Garnett, Armstead and Jones. Several Confederate generals were captured. Among the Union officers killed were Generals Reynolds, Zook and Weed; Colonels Cross, Willard, Sherrill and Vincent. Among the wounded were Generals Hancock, Meredith, Gibbon, Sickles, Paul, Tyler, Graham and Barlow. Several others were captured. The losses on both sides were very large, being nearly one-fifth of the numbers engaged. The estimated size of the two armies places them on about an equal footing. This battle, in the opinion of the military critics, decided the fate of the Confederacy. At Gettysburg its military power was broken, and from that point onward its path was one of continual decline till the surrender at Appomattox.

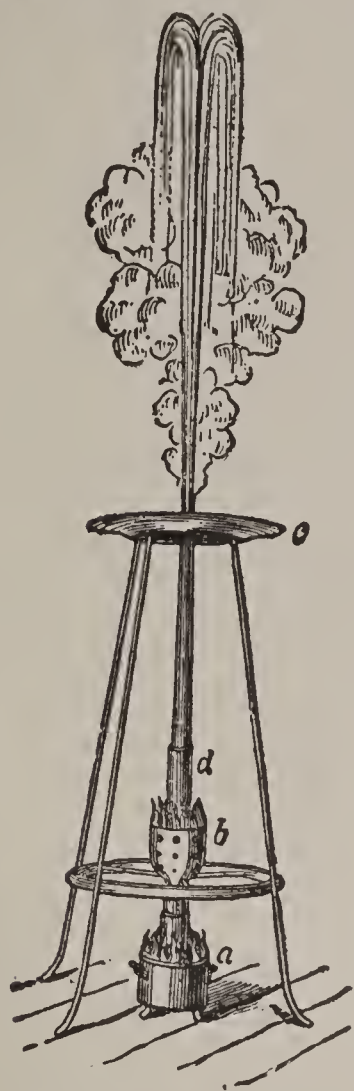
GEULINX, ARNOLD, one of the most distinguished of the earlier Cartesians, was born at Antwerp in 1625. Few details are known with regard to his life, and his more important works are extremely rare.

GEUM, a genus of Rosaceæ, sub-order Potentilleæ, distinguished from Potentilla by the hardened hooked styles which crown the carpels, so that the fruit becomes a bur. Two species are common natives of Britain, *G. urbanum*, the Wood Avens or Herb Bennet, and *G. rivale*, Water Avens, the former with erect yellow flowers of a brownish hue. The former grows in hedge and thickets, the latter in wet meadows and woods, and sometimes even in very alpine situations. *G. canadense*, the Chocolate Root or Blood Root of North America enjoys a considerable reputation as a mild tonic. Some varieties of the genus are used in preparing liqueurs.

GEX, a town of France, the chief town of an arrondissement in the department of Ain, is beautifully situated at the base of the Jura chain on the Journant, three miles from the Swiss frontier, and ten miles northwest of Geneva. Population, 9,000.



GEYSERS, GEISERS, or GEISIRS, are fountains of a peculiar construction, in virtue of which they shoot up into the air, at more or less irregular intervals of time, a column of heated water and steam or of mud.



ARTIFICIAL GEYSER.

Those of Iceland have been known at least from the time of Saxo Grammaticus, who briefly mentions them in his history of Danish kings; but no satisfactory explanation of the phenomena was advanced till near the middle of the present century, when Bunsen brought his scientific knowledge and power of investigation to bear on the subject. By Bunsen's theory the whole difficulty is solved, as is beautifully demonstrated by the artificial geyser designed by Professor J. H. J. Müller of Freiburg. If the tube *ab* be filled with water and heated at two points, first at *a* and then at *b*, the following succession of changes is produced. The water at *a* beginning to boil, the superincumbent column is consequently raised, and the stratum of water which was on the point of boiling at *b* being subjected to a diminished pressure; a sudden evolution of steam accordingly takes place at *d*, and the superincumbent water is violently ejected. Received in the basin *c*, the air-cooled water sinks back into the tube, and the temperature of the whole column is consequently lowered; but the under strata of water are naturally those which are least affected by the cooling process; the boiling begins again at *A*, and the same succession of events is the result. The principal difference between the artificial and the natural geyser-tube is that in the latter the effect is not necessarily produced by two distinct sources of heat like the two fires of the experimental apparatus, but by the continual influx of heat from the bottom of the shaft and the differences between the boiling points of the different parts of the column owing to the different pressures of the superincumbent mass.

Any hot springs capable of depositing siliceous material by the evaporation of its water may in course of time transform itself into a geyser, a tube being gradually built up as the level of the basin is raised. And every geyser continuing to deposit siliceous material is preparing its own destruction; for, as soon as the tube becomes deep enough to contain a column of water sufficiently heavy to prevent the lower strata attaining their boiling points, the whole mechanism is deranged. In geyser districts it is easy to find thermal springs busy with the construction of the tube; warm pools or *laugs*, as the Icelanders call them, on the top of siliceous mounds, with the mouth of the shaft still open in the middle; and dry basins from which the water has receded with their shafts now choked with rubbish.

Geysers exist at the present time in many volcanic regions, as in the Eastern Archipelago, Japan, and South

America; but the three localities where they attain their highest development are Iceland, New Zealand and in the Yellowstone Park region. The very name by which we call them indicates the historical priority of the Iceland group. It is an old Icelandic word — *geysir*, equivalent to gusher or rager — from the verb *geysa*, itself a derivative of *gjosa*, to gush. In native use it is the proper name of the Great Geyser, and not an appellative — the general term *hver*, a hot spring, making the nearest approach to the European sense of the word.

The Iceland geysers are situated about fifty miles northwest of Hecla, in a broad valley of alluvial formation, at the foot of a range of hills from 300 to 400 feet in height. Within a circuit of about two miles, upward of one hundred hot springs may be counted, varying greatly both in character and dimensions. The Great Geyser in its calm periods appears as a circular pool seventy-two feet in diameter and four feet in depth, occupying a basin on the summit of a mound of siliceous concretion; and in the center of the basin is a shaft, about nine feet in diameter and seventy feet in depth, lined with the same siliceous material. The clear sea-green water flows over the eastern rim of the basin in little runnels. On the surface it has a temperature of from 76° to 89° Cent., or from 168° to 188° Fahr. Within the shaft there is, of course, a continual shifting both of the average temperature of the column and of the relative temperatures of the several strata.

About 100 paces from the Great Geyser is the *Strokkur* or churn, which was first described by Stanlay in 1789. The shaft in this case is about forty-four feet deep, and, instead of being cylindrical, is funnel-shaped, having a width of about eight feet at the mouth, but contracting to about ten inches near the center. By casting stones or turf into the shaft so as to stopper the narrow neck, eruptions can be accelerated, and they often exceed in magnitude those of the Great Geyser itself.

The great geyser-district of New Zealand is situated in the south of the province of Auckland, in or near the upper basin of the Waikato river to the northeast of lake Taupo. In many respects the scene presented in various parts of the district is far more striking and beautiful than anything of the same kind to be found in Iceland, but this is due not so much to the grandeur of the geysers proper as to the bewildering profusion of boiling springs, steam jets, and mud volcanoes, and to the fantastic effects produced on the rocks by the siliceous deposits, and by the action of the boiling water. But it is in the Yellowstone Park, in the northwest corner of Wyoming, that the various phenomena of the geysers can be observed on the most portentous scale. The geysers themselves are to be counted by hundreds, and the dimensions and activity of several of them render those of Iceland and New Zealand almost insignificant in comparison. The principal groups are situated along the course of that tributary of the Upper Madison which bears the name of Fire Hole River. Many of the individual geysers have very distinct characteristics in the form and color of the mound, in the style of the eruption, and in the shape of the column. The "Giantess," as observed by Langford (1870) and Dunraven (1874), lifts the main column to a height of only fifty or sixty feet, but shoots a thin spire to no less than 250 feet. The "Castle" varies in height from ten or fifteen to 250 feet; and on the occasions of greatest effort the noise is appalling, and shakes the ground like an earthquake. "Old Faithful" owes its name to the regularity of its action. Its eruptions, which raise the water to a height of 100 or 150 feet, last for about five minutes, and recur every three-quarters of an hour. The "Beehive" sometimes attains a height of 219 feet;



and the water, instead of falling back into the basin, is dissipated in spray and vapor.

GEZER, a royal Canaanite city on the boundary of Ephraim in the maritime plain. It was allotted to the Levites, but its original inhabitants were not driven out until the time of Solomon, when the Egyptians took the city, which was given to Solomon's wife.

GFRÖRER, AUGUST FRIEDRICH, a German historian, was born at Calw, in the Black Forest, March 5, 1803. He studied theology at Tübingen, next lived at Lausanne, Geneva, and Rome, becoming on his return in 1828 a *Repetent* at Tübingen, and in 1830 librarian at Stuttgart. He now gave himself with much zeal to historical studies, of which the first fruit was his *Philo und die Jüdisch-Alexandrinische Theosophie* (1831), followed by *Gustav Adolf* (1835), a work which aimed at bringing into prominence the political rather than the religious rôle of the great Swedish king. His *Geschichte des Urchristenthums* (1838) was called forth by the greater work of Strauss. In his *Allgemeine Kirchengeschichte* (1841-46), coming down to 1305, he first spoke out his admiration for the polity of the Roman Church. Soon after he was called to the chair of History at Freiburg, and in 1848 he was sent to the Frankfurt parliament, where he was one of the most decided adherents of the party called the *Grossdeutschen*, the fanatical opponents of Prussia. He formally went over to Rome in 1853, and thereafter was distinguished by his large share of the intolerance of the convert, although all the while he was never a dogmatically satisfactory Catholic. He died at Carlsbad July 6, 1861. His most important other works were *Geschichte der Karolinger* (1848) and *Papst Gregorius VII.* (1859-61). All his works are learned, often perversely so; his conclusions are too often more ingenious than sound.

GHÁTS, or GHATS (in English "gates, passes, or landing stairs"), Eastern and Western. Two converging ranges of mountains which run parallel with the east and west coast of Southern India, and meet at an angle near Cape Comorin. (1) The Eastern Gháts commence in the vicinity of Balasor, a little north of the Mahanadi and run through Madras, with an average height of 1,500 feet, for the most part at a distance of from 50 to 150 miles from the coast. They are nowhere a watershed on any considerable scale, being penetrated and crossed by nearly all the drainage of the interior. (2) The Western Gháts stretch from the valley of the Tapti, in about the same latitude as Balasor to their junction with the kindred ridge, and to Cape Comorin itself. Though they are generally far more continuous and distinct than the Eastern Gháts, yet they are sharply divided by the gap of Palghát, the northern section measuring 800 miles in length, and the southern 200. Their general elevation varies from about 3,000 feet to upward of 7,000; the peak of Dodabetta, in the Nilgiri hills, is 8,760 feet above the sea level. The opposite faces of these mountains differ very remarkably from each other. Landward, there is a gradual slope to the table land of the Deccan; seaward, almost perpendicular precipices, speaking generally, sink at once nearly to the level of the sea, with only a comparatively narrow strip between them and the shore. This peculiarity, along with the heavy rainfall, brought by the southwest small monsoon, causes, more particularly toward the south, that singular feature of the country which is known as the "Backwaters."

The Western Gháts are a watershed, for not a single stream of any magnitude finds its way through them. Their vast primeval forests display some of the most magnificent scenery in India, and supply abundance of the finest timber. In the south there is a railway from Beypur to Madras, finding a comparatively easy access

to the interior by the Palghat valley. In the north, near Bombay, two railways scale the precipitous face of the western Gháts. Of these, the line up the tremendous ravine of the Bhor Ghát, forty miles southeast of Bombay, is regarded as one of the greatest engineering feats ever accomplished in India. The railway rises by a lift of fifteen and one-half miles to a height of 1,831 feet, twisting around the mountains on narrow ledges that are often half embankment, or that rest on high vaulted arches, and passing through tunnels that aggregate 2,535 yards. Besides eight viaducts, there are eighteen bridges and fifty-eight culverts, and the average gradient is one in forty-eight.

The name Gháts is also applied to the flights of steps, whether intended as landing-places or as bathing-stairs, which line the river banks and towns and places of pilgrimage in northern and central India. Most great rivers, and especially the Ganges, possess many Gháts; but they are also built on the margins of lakes, as at Pushkar and Sagar, or even of tanks. The uniformity of the long lines of steps is often broken by shrines or temples, built either close to the waters edge or at the top; and on these steps are concentrated the pastimes of the idler, the duties of the devout, and much of the necessary intercourse of business. The Gháts of Benares, Hardwar, Panharpur, and of Maheswar, on the Nerbudda, are noteworthy either for their number or beauty, while Cawnpore, Sadullapur, the ruined city of Gaur, and other places possess noted "burning gháts," for purposes of cremation. See also Fergusson's *Handbook of Architecture*.

GHAZALI, ABU MOHAMMED AL-, known in the west as Algazel, a Moslem theologian who, in the eleventh century, struck a serious blow at the scholastic philosophy of the Arabians. Born at Tus, in Khorasan, in 1058, he studied in his native city and at Nishapur, being especially nurtured on the principles of Sufism. When thirty-three years old he was appointed by the grand-vizier of Bagdad to a chair of philosophy in the university of that city. But four years later he set off for Mecca; then spent ten years lecturing at Damascus; and finally went on to Jerusalem and Alexandria, where also he taught with signal success. In the end, however, he returned to Tus, where he founded a Sufic college and dedicated the remainder of his life until 1111, the year of his death, to religious and philosophic contemplation. The most notable of his numerous works are: *Opinions of the Philosophers* and *Tendencies of the Philosophers*. This latter is virtually an introduction to the more famous *Destruction of the Philosophers*, in which he challenges the methods and conclusions of the current scholasticism of Arabian philosophy. He also wrote a commentary on the ninety-nine names of God, several ethical treatises, and various other works on religion and philosophy. Several of his works have never yet been published.

GHÁZIÁBÁD, a town in Meerut district, Northwestern Provinces of India, distant twelve miles from Delhi and twenty-eight miles from Meerut. Population (1889), 12,059.

GHAZIPUR, a city of India, capital of a district of the same name in the Northwest Provinces, stands on the left bank of the Ganges, forty-four miles northeast of Benares. The city, which stretches along the Ganges for about two miles, contains the ruins of the Palace of Forty Pillars, and a marble statue by Flaxman of Lord Cornwallis, who died here in 1805. Ghazipur is the headquarters of the Government Opium Department for the Northwest Provinces, all the opium from these provinces being manufactured here, and there is some trade in sugar, tobacco, rose-water and coarse long cloth. Population (1889), 43,232. The *district*,



of which Ghazipur is the administrative headquarters, has an area of 1,473 square miles, and a population of 1,014,099.

GHAZNI (also spelt GHIZNI and GHUZNEE), a fortified town of Afghanistan, stands below a spur of a range of hills at an elevation of 7,729 feet, eighty-four miles southwest of Kabul, on the road to Kandahar, at the head of the Gomal route to India. It is a place of considerable commercial importance, the climate is cold, snow often lying for three months in the year; nevertheless, wheat, barley and madder are grown in the vicinity. Its population is estimated at about 10,000. From the tenth to the twelfth century Ghazni was the capital of the empire of the Ghaznevids. It then fell into the hands of the sultan of Ghūr, and enjoyed a second period of splendor. Having shortly afterward been captured by the Mongols, it rapidly fell into decay. It remained however, subject to the descendants of Baber, the Mongol rulers of Delhi and Agra down to 1738, when it was taken by Nadir Shah of Persia, and at his death was incorporated in the kingdom of Afghanistan. During the nineteenth century it figured in the British wars against the Afghans, having been stormed by Lord Keane in 1839, and again in 1842 by the Afghans, but retaken the same year by General Nutt. In the neighborhood of Ghazni there are several ruins and monuments of its former greatness, such as the tomb of Mahmud, Mahmud's dam in the Ghazni river, numerous ruin-heaps northeast of the town, and many Mohammedan shrines. The celebrated gates of Somnath were kept at Ghazni from 1024 to 1842.

GHEE, (Sanskrit, *Ghrita*), a kind of clarified butter made in the East. The best is prepared from butter of the milk of cows, the less esteemed from that of buffaloes. The butter is melted over a slow fire, and set aside to cool; the thick, opaque, whitish, and more fluid portion, or ghee, representing the greater bulk of the butter, is then removed. The less liquid residue, mixed with groundnut oil, is sold as an inferior kind of ghee. Old ghee is in special repute among the Hindus as a medicinal agent, and its efficacy as an external application is believed by them to increase with its age. Ghee more than ten years old, the *purāna ghrita* of Sanskrit materia medica, has a strong odor, and the color of lac. Some specimens which have been much longer preserved—and “clarified butter a hundred years old is often heard of”—have an earthy look, and are quite dry and hard, and nearly inodorous. Medicated ghee is made by warming ordinary ghee to remove contained water, melting, after the addition of a little turmeric juice, in a metal pan at a gentle heat, and then boiling with the prepared drugs till all moisture is expelled, and straining through a cloth.

GHEEL, or GEEL, a town of Belgium, in the province of Antwerp, about twenty-five miles east of Antwerp, on the railway between Herenthals and Moll, with a population of 10,265. Situated in the midst of that half barren stretch of moorland which is known as the Campine or Kampenland, it would have been of little importance, in spite of its manufactures of cloth, leather, wooden shoes and wax-lights, had it not for long centuries been the seat of a unique method of dealing with the insane. A local legend, tracing the origin of the town back to a chapel of St. Martin erected in the seventh century, goes on to tell how an Irish princess, fearing the fate that long afterward befel Beatrice Cenci, sought refuge in this remote asylum, but was pursued by her relentless father and put to death, along with a priest Gerrebert, the companion of her flight. The tomb of the victims was soon discovered to have a healing virtue for minds diseased; the sainted

Dymphna became the patroness of the insane; and a large and beautiful church in her honor was erected on the site of St. Martin's chapel. Commenced in the twelfth century, it was finished in 1340, and consecrated by the bishop of Cambray; and the pilgrimages to the tomb were sanctioned by a brief of Eugenius IV. In 1538 Jean de Mérode, within whose domains the church was situated, instituted a vicariate of nine priests and a director, and in 1562 Henri de Mérode transformed the vicariate into a regular chapter of nine canons and a dean. The church still remains to bear witness to the importance formerly attached to the shrine; and though the tomb of St. Dymphna has long been a cenotaph, a few stray enthusiasts still pass beneath it in hopeful imitation of the thousands in by-gone years, whose knees have worn deep furrows in the pavement as they made their ninefold transits on nine successive days. As food and lodging had to be provided for the patients who were brought to the saint, the inhabitants of Gheel grew accustomed to the treatment of the various kinds of mental alienation, and gradually discovered that forcible measures were much less frequently necessary, and danger less likely to result from free intercourse with the insane, than was generally believed throughout Europe. When M. Pontecoulant was appointed by Napoleon prefect of the Revolution department of the Dyle, his attention was called to the success of the domestic régime in force at Gheel, in contrast to the sad condition of affairs in the asylum at Brussels, and he caused the patients to be removed from the capital to the little country town. His example was freely followed by the authorities of different districts, and Gheel received full official recognition. Investigations undertaken about 1850 by M. Ducpétiaux, inspector-general of benevolent establishments in Belgium, resulted in the reform of such abuses as had crept into the system; and the relations of the patient and his protectors were placed on a strict legal footing by the law of May 1, 1851. Further ameliorations have been introduced in 1852, 1857, 1858, etc. The whole management of the system is under the supervision of officially appointed physicians, and the advantages of a regular establishment are thus combined with those of domestic comfort, social freedom and activity. Permission to receive patients is granted not only to the town residents, but also to the villagers of the vicinity. The support of the patients is in most cases guaranteed by the state.

GHENT, a city of Belgium, at the head of the province of East Flanders, is situated about thirty miles to the west of Antwerp, on the Scheldt and the Lys. The two streams branch out to such an extent as to partition the town into twenty-six islands, which are connected by about two hundred and seventy bridges, forty-two being of stone, and twenty-eight of the others being wooden structures of considerable size. In general Ghent is well built, and, though the older portion has narrow and gloomy lanes, it occupies as a whole a larger area than most European towns in proportion to the population and the number of houses. A striking and pleasing feature is the number of promenades, the most noteworthy being the Coupure, or “Cutting,” so called from the branch of the Bruges canal constructed in 1758.

The cathedral of St. Bavon ranks as one of the most splendid of the churches of Belgium. Though the original foundation dates from the ninth or tenth century, the crypt and choir of the actual edifice have no higher antiquity than the thirteenth century, and the other parts were not completed till the sixteenth. The church of St. Nicholas—an early Gothic structure, with a great tower of the fifteenth century and a modern portico—has the credit of being the oldest in the town;



and St. Michael's dating from about 1450, but frequently restored, is memorable as the scene of the worship of reason during the French Revolution.

Among the secular buildings of Ghent one of the finest is the Hôtel de Ville, its northern façade being an exceptionally rich example of flamboyant Gothic of the fifteenth century, and its eastern façade presenting a curious contrast, with its rows of Doric, Ionic, and Corinthian columns after the style of the Italian Renaissance. The court-house or palais de justice is a heavy but imposing structure in the Romanesque manner, erected between 1835 and 1843 by the architect Roelandt at the common expense of the state, the province, and the town.

With benevolent institutions of various kinds Ghent is abundantly supplied.

The spacious university buildings were erected between 1819 and 1826, at the expense of the city, under the auspices of William I., king of Holland. They were designed by Roelandt in the Greek style, and one of the principal features is a portico after the model of the Pantheon at Rome. The university library, containing upward of 100,000 volumes, and reckoned one of the most valuable in Belgium, was formerly the property of the town.

Though Ghent has no longer the industrial preëminence that it enjoyed in the fourteenth and fifteenth centuries, it is still the principal seat of the cotton and leather manufactures of Belgium. Flax-spinning, calico-printing, and sugar-refining are also extensively carried on, and there are engineering works, chemical works, iron-foundries, soap works, paper-mills, and breweries. The harbor, completed in 1828, is capable of accommodating 400 vessels, and vessels drawing seventeen feet of water can unload under the walls of the town. At Sas van Gend, fifteen miles north of the city, on the frontier of Holland, there are sluices by which the district can be laid under water.

In 1812 Ghent had no more than 55,161 inhabitants; by 1856 they had increased to 109,668, and by 1869 to 121,460. It has now a population of 150,000.

The investigations of local antiquaries leave it still doubtful whether Ghent had a Roman origin, as Petrarch supposed. That there was a military fortress on the spot in the seventh century, is proved by Baudemont's life of St. Amand, the first missionary of Christianity in the district. By the end of the thirteenth century Ghent was a greater city than Paris. In the fourteenth, under the leadership of the famous Jacob van Artevelde and his son Philip (1332-1382), it raised frequent insurrections against the counts of Flanders, and took a prominent part in the political movements of the Low Countries. At the commencement of the fifteenth century it had upward of 40,000 men employed in the woolen manufactures alone, and was able to place in the field from 18,000 to 20,000 men-of-arms. It was by the pacification of Ghent, signed in the town-hall November 8, 1578, that Holland and Zeeland, and the southern states of the Netherlands, formed an alliance against the Spanish supremacy, and three days after the Spanish garrison capitulated to the citizens. In 1584, however, the duke of Parma captured the town for Philip, and the citadel, which had been almost completely demolished, was restored. The attempts of the French in 1641 and 1642 to get possession of Ghent were frustrated by laying the country under water; but in 1678, though in the meanwhile the fortifications had been considerably extended, the feeble garrison under Don Francisco de Pardo was unable to defend the place against Marshals Humières, Luxembourg, Schomberg and Vauban. Ghent continued in French hands till the peace of Nimwegen. It played an important part in the war of the Spanish succession,

being captured in 1706 by Marlborough, recovered in 1708 by the French Marquis de Grimaldi, and again captured by Marlborough in 1709. In the war of the Austrian succession, Louis XIV. made his entry into the city July 25, 1745, and remained in possession till the treaty of Aix-la-Chapelle in 1748. By order of Joseph II., in 1781, the citadel and fortifications were dismantled, and the grounds on which they were built were sold. Under the régime of the French Revolution the city was made the chief town of the department of the Scheldt. By the peace of Paris (1814) it passed with Belgium to Holland; but it took an active part in the movement for the separation of the two kingdoms, and, after the separation was accomplished (1830), continued to be the headquarters of the agitation of the Orange party. In 1814 the treaty of peace between Great Britain and the United States was signed in Ghent.

GHEENT, JODOCUS, or JUSTUS, OF. The public records of the city of Ghent have been diligently searched, but in vain, for a clue to the history of Justus or Jodocus, whom Vasari and Guicciardini called Giusto da Guanto. Flemish annalists of the sixteenth century have enlarged upon the scanty statements of Vasari, and described Jodocus as a pupil of Hubert Van Eyck. But there is no source to which this fable can be traced. The registers of St. Luke's guild at Ghent comprise six masters of the name of Joos or Jodocus who practiced at Ghent in the fifteenth century. But none of the works of these masters have been preserved, and it is impossible to compare their style with that of Giusto. It was between 1465 and 1474 that this artist executed the Communion of the Apostles which Vasari has described, and modern critics now see to the best advantage in the museum of Urbino. It was painted for the brotherhood of Corpus Christi at the bidding of Frederick of Montefeltro, who was introduced into the picture as the companion of Caterino Zeno, a Persian envoy at that time on a mission to the court of Urbino. From this curious production it may be seen that Giusto, far from being a pupil of Hubert Van Eyck, was merely a disciple of a later and less gifted master, who took to Italy some of the peculiarities of his native schools, and forthwith commingled them with those of his adopted country.

GHERARDESCA, UGOLINO DELLA, count of Donoratico, and head of the Gherardeschi, one of the leading Ghibelline houses of Pisa, began to take part in public affairs about the time when the dissensions which had arisen about the partition of Sardinia had resulted in sending over the entire clan of the Pisan Visconti to the Guelphs. In August, 1288, he was beset in the Palazzo del Popolo by the Ghibellines, and, after fire had been set to the building, taken prisoner, along with his sons, Gaddo and Ugoccione, and his grand-sons, Nino (surnamed Brigatto) and Anselmuccio. After having been confined for twenty days in the Palazzo del Comune, they were removed to the Gualandi's Tower, Alle Sette Vie, afterward called the Torre della Fame. Here they were kept till March, 1289, when, by order of the archbishop, the door was locked, and the keys thrown into the Arno. Nine days afterward the tower was re-entered, and the bodies removed to the church of San Francisco.

GHERIAH, a town and fortress of British India, in the presidency of Bombay, about 170 miles south of Bombay, otherwise called Viziadrug. See VIZIADRUG.

GHIBELLINES. See GUELPHS.

GHIBERTI, LORENZO, whose name alone is worthy to rank with that of Donatello among the grand Italian sculptors of the Renaissance, was born at Florence in the year 1378. He learned the trade of a goldsmith under his father Ugoccione, commonly called



Cione, and his stepfather Bartoluccio. In the early stage of his artistic career, Ghiberti was best known as a painter in fresco, and when his native city Florence was visited by the plague he repaired to Rimini, where he executed a highly prized fresco in the palace of the sovereign Pandolfo Malatesta. He was recalled from Rimini to his native city by the urgent entreaties of his stepfather Bartoluccio, who informed him that a competition was to be opened for a design of a second bronze gate in the baptistery, and that he would do wisely to return to Florence and take part in this great artistic contest. The subject for the artists was prescribed—the Sacrifice of Isaac; and the competitors were required to observe in their work a certain conformity to the first bronze gate of the baptistery, executed by Andrea Pisano about 100 years previously. Of the six designs presented by different Italian artists, those of Donatello, Brunelleschi and Ghiberti were pronounced the best, and of the three Brunelleschi's and Ghiberti's superior to the third, and of such equal merit that the thirty-four judges with whom the decision was left intrusted the execution of the work to the joint labor of the two friends. Brunelleschi, however, withdrew entirely from the contest—according to one account, from his cordial admiration of Ghiberti's genius, according to another, from his unwillingness to share so great an undertaking with any fellow-laborer. The first of his two bronze gates for the baptistery occupied Ghiberti twenty years, and when completed was justly regarded as the greatest work of its kind since the most glorious days of Grecian art. Ghiberti brought to his task a deep religious feeling and the striving after a high poetical ideal which are not to be found in the works of Donatello, though in power of characterization the second sculptor often stands above the first. Like Donatello, he seized every opportunity of studying the remains of ancient art; but he sought and found purer models for imitation than Donatello, through his excavations and studies in Rome, had been able to secure. The council of Florence, which met during the most active period of Ghiberti's artistic career, not only secured him the patronage of the pontiff, who took part in the council, but enabled him, through the important connections which he then formed with the Greek prelates and magnates assembled in Florence, to obtain from many quarters of the Byzantine empire the precious memorials of old Greek art; which he studied with untiring zeal. The unbounded admiration called forth by Ghiberti's first bronze gate led to his receiving from the chiefs of the Florentine guilds the order for the second, of which the subjects were likewise taken from the Old Testament. The Florentines gazed with especial pride on these magnificent creations, which must still have shown with all the brightness of their original gilding when, a century later, Michelangelo pronounced them worthy to be the gates of paradise. Next to the gates of the baptistery Ghiberti's chief works still in existence are his three statues of St. John the Baptist, St. Matthew, and St. Stephen, executed for the church of San Michele, among which three works, from the ideal character of the entire figure and the peculiar felicity of expression, the palm is generally awarded to the St. Stephen. In the bas-relief of the coffin of St. Zenobio, in the Florence cathedral, Ghiberti put forth much of his peculiar talent, and though he did not, as is commonly stated, execute entirely the painted glass windows in that edifice, he furnished several of the designs, and did the same service for a painted glass window in the church of San Michele. He died at the age of seventy-seven.

GHİKA, HELENA, Princess Koltzoff-Massalsky, better known by her literary pseudonym of Dora

d'Istria, was a daughter of Prince Michael Ghika, was niece of two Hospodars of Wallachia, and was born at Bucharest, January 22, 1829. The family from which she was descended was Albanian in origin, and, from the time of George Ghika, Hospodar of Wallachia, in 1660, gave many princes and eminent men to the principalities. Profoundly instructed in the classics under the care of George Pappadopoulos, the princess added to her acquirements by traveling through Germany, France and Italy, an extensive knowledge of modern languages and literature. At fifteen she commenced a translation of the *Iliad* into German, and, not long after, wrote several pieces for the theater. On her unhappy marriage in 1849 with Prince Koltzoff-Massalsky, she accompanied her husband to the court of St. Petersburg; but from 1855 she resided mainly at Florence, where she died November 22, 1888. Her first important work *La Vie Monastique dans l'Eglise Orientale*, was published in 1855. Other works were: *La Suisse Allemande* (1856); *Les Femmes en Orient* (1860); *Excursions en Roumelie* (1863); *Aux Bords des Lacs Helvétiques* (1864); *Des Femmes par une Femme* (1864); *Gli Albanesi in Rumenia*; *Storia de Principi Ghika* (1873); *La Poesie des Ottomans* (1873). She wrote much for the *Revue des Deux Mondes*, and other journals and magazines of France, Italy, Belgium, and Switzerland; and her writings on Albanian literature stirred up a notable literary and national movement among the Albanians. She was made a member of several learned societies, and an honorary citizen of the Greek kingdom.

GHILAN, or GILAN, a province of Persia, lying along the southwest shore of the Caspian, separated from the Russian district of Talish by the Astara, and bounded west by Azerbaijan, south by Irak Adjemi, and southeast by Mazanderan. It is about 150 miles in length, with a breadth varying from fifteen to fifty miles; and its area is estimated at from 4,500 to 5,000 square miles. The greater portion of the province is a lowland region shut in by the mountains of the Elburz range; and though the Kyzyl Usen, which has its sources in the mountains of Kurdistan, is the only river of any size, the country is abundantly watered, and vast stretches of swamp are found in various directions. This is mainly due to the character of the climate, which is distinguished by a very heavy precipitation both in winter and summer. Vegetation is almost tropically luxuriant, and the forests are as dense as an Indian jungle. Oaks, maples, ash trees, *planeras*, lime trees, and *parrottias*, are among the prevailing types. The chestnut-leaved oak attains colossal proportions, and a height at times of 130 or 140 feet; and the box tree comes to rare perfection, and forms an important source of wealth. Vines and pomegranates, walnuts, plums, pears and apples grow wild; and oranges, lemons, peaches and other fruits are easily cultivated, though sometimes a severe winter proves fatal to the trees. Hitherto the most successful occupation has been silk-growing; but frequent failures in the crop have disheartened, if they have not ruined, many of the silk-masters. Animal life is nearly as well represented in Ghilan as vegetable life. Tigers, wild boars, deer, and a considerable variety of snakes are found in the jungles; pheasants are a common form of game; aquatic birds of various kinds—pelicans, storks, heron, gulls, ducks, etc., swarm along the coast; and the fisheries in the Caspian are highly productive. Wild horses are to be met with in the forests. A striking instance of the primitive state of matters is furnished by Mr. Mounsey, who tells how the machinery ordered by the Shah from Europe for his new mint was allowed to go to ruin in the sand at Enzelli, because it was found im-



possible to provide for its conveyance.

The administration of the province is nearly as primitive as its system of roads, and consists of nothing but machinery for the collection of the taxes, which yield about £63,000 to the royal revenue. The capital is Resht.

**GHIRLANDAJO, DOMENICO DEL** (1449–1494), an illustrious Florentine painter. The painter is generally termed Domenico Bigordi, but some authors give him, and apparently with reason, the paternal surname Curradi. Ghirlandajo (garland-maker) was only a nickname, coming to Domenico from the employment of his father (or else of his earliest instructor), who was renowned for fashioning the metallic garlands worn by Florentine damsels; he was not, however, as some have said, the inventor of them. His youthful years were entirely undistinguished, and at the age of thirty-one he had not a fixed abode of his own. This is remarkable, as immediately afterward, from 1480 onward to his death at a comparatively early age, in 1494, he became the most proficient painter of his time, incessantly employed, and condensing into that brief period of fourteen years fully as large an amount of excellent work as any other artist that could be named; indeed, we should properly say eleven years, for nothing of his is known of a later date than 1491.

In general artistic attainment Ghirlandajo may fairly be regarded as exceeding all his precursors or competitors; though the names of a few, particularly Giotto, Masaccio, Lippo Lippi, and Botticelli, stand higher for originating power. His scheme of composition is grand and decorous; his chiaroscuro excellent, and especially his perspectives, which he would design on a very elaborate scale by the eye alone; his color is more open to criticism, but this remark applies much less to the frescos than the tempera-pictures, which are sometimes too broadly and crudely bright.

**GHIRLANDAJO, RIDOLFO**, son of Domenico, was also a painter of considerable celebrity. Born on February 14, 1483, and being thus less than eleven years old when his father died, he was brought up by his uncle David. To this second-rate artist he owed less in the way of professional training than to Granacci, Piero di Cosimo, and perhaps Cosimo Roselli. It has been said that Ridolfo studied also under Fra Bartolommeo, but this is not clearly ascertained. He was certainly one of the earliest students of the famous cartoons of Leonardo da Vinci and Michelangelo. He was prominent in the execution of vast scenic canvases for various public occasions, such as the Wedding of Giuliano de' Medici, and the Entry of Leo. X. into Florence in 1515. In his prime he was honest and conscientious as an artist; but from about 1527 he declined, having already accumulated a handsome property, more than sufficient for maintaining in affluence his large family of fifteen children, and his works became comparatively mannered and self-repeating.

**GHIZNI.** See **HAZNI**.

**GHOORKAS.** See **NEPAL**.

**GHOST-MOTH** (*Hepialus humuli*), a species of moth very common in many parts of Britain, of which the caterpillar, popularly known as the "Otter," often commits great ravages in hop gardens, devouring the roots of the plants. It feeds also on the roots of the nettle, burdock and some other plants. The moth belongs to a small family (*Hepalidæ*), often popularly called "Swifts" from their rapid flight. The antennæ are short, the wings long and narrow, the entire size about two inches across. The male is entirely of a satiny white color above, and the female yellowish and reddish, with darker markings; both sexes are brown on the under side. They are to be seen flying about in the

twilight, generally over lawns and pastures, not infrequently in church yards. From this circumstance, and from the white color of the males and their sudden disappearance in the imperfect light on their folding their wings or rising above the level of the spectator's eye (so that the brown part is turned toward him), they derive their name. The caterpillar, which is sometimes two inches long, is yellowish white with scattered hairs. It spins a large cylindrical cocoon among the roots on which it has been feeding, and then becomes a chrysalis. Two other common species of generally similar habit are *H. lupulinus* and *H. hectus*.

**GHUR** is the name of a territory in Asia, and **GHURI** that of a dynasty deriving its origin from that territory.

The name of Ghúr was, in the Middle Ages, and, indeed, locally still is, applied to the highlands east of Herat, and extending eastward to the upper Helmand valley, or nearly so. There is hardly any region of Asia regarding which we continue to be more in the dark than about this. Ghúr is the southern portion of that great peninsula of strong mountain country which forms the western part of modern Afghanistan, and which may be taken, in a general way, to represent the Paropamisus of the ancients. The northern portion of the said peninsula was, in the Middle Ages, comprehended under the names of *Gharjistán* (on the west), and *Fuzjáná* (on the east), while the basin of the Herat river, and all south of it, constitute Ghúr. The name as now used does not, perhaps, include the valley of the Herat river; on the south the limit seems to be the declivity of the higher mountains dominating the descent to the lower Helmand, and the road from Farrah to Kandahar. It is in Ghúr that rise all those affluents of the closed basin of Seistán, the Harút the Farrah-rúd, the Khásh-rúd (see **AFGHANISTAN**), besides other considerable streams joining the Helmand above Girishk.

Ghúr is mentioned in the Shahnamah of Firdousi (1010 A.D.), and in the Arab geographers of that time, though these latter fail in details almost as much as we moderns, thus indicating how little accessible the country has been through all ages.

**GIAMBELLI, or GIANIBELLI, FEDERIGO**, a military engineer, was born at Mantua about the middle of the sixteenth century. Having had some experience as a military engineer in Italy, he went to Spain to offer his services to Philip II. His proposals were, however, somewhat lukewarmly received, and as he could obtain from the king no immediate employment, he took up his residence at Antwerp, where he soon gained considerable reputation for his knowledge in various departments of science. He is said to have vowed to be revenged for his rebuff at the Spanish court; and when Antwerp was besieged by the duke of Parma in 1584, he put himself in communication with Queen Elizabeth, who having satisfied herself of his abilities, engaged him to aid by his counsels in its defense. His plans for provisioning the town were rejected by the senate, but they agreed to a modification of his scheme for destroying the famous bridge which closed the entrance to the town from the side of the sea, by the conversion of two ships of sixty and seventy tons into infernal machines. One of these exploded, and, besides destroying more than 1,000 soldiers, effected a breach in the structure of more than 206 feet in width, by which, but for the hesitation of Admiral Jacobzoon, the town might at once have been relieved. After the surrender of Antwerp Giambelli went to England, where he was engaged for some time in fortifying the river Thames; and when the Spanish Armada was attacked by fire-ships in the Calais roads, the panic which ensued was due to the conviction among the Spaniards that the fire-ships were infernal machines constructed by Giambelli. He is



said to have died in London, but the year of his death is unknown.

GIANNONE, PIETRO, the most distinguished historian of whom Naples can boast, and among all Italian historians second alone to Fra Paulo Sarpi for the strong and clear light thrown in his works on the growth of the papal power, was born at Ischitella, in the province of Capitanata, on May 7, 1676. Arriving in Naples at the age of eighteen, he devoted himself to the study of law, but his legal pursuits were much surpassed in importance by his literary labors. He devoted twenty years to the composition of his great work, *The Civil History of Naples*, which was ultimately published in 1723. He was on account of his position in regard to the papacy, compelled to flee to Austria, where he was received with favor and given a pension. On the transfer of the Neapolitan crown to Charles of Bourbon, Giannone lost his Austrian pension, and was compelled to remove to Venice. There he was at first most favorably received. The post of consulting lawyer to the republic, in which he might have continued the special work of Fra Paulo Sarpi, was offered to him, as well as that of professor of public law in Padua; but he declined both offers. Unhappily there arose a suspicion that his views on maritime law were not favorable to the pretensions of Venice, and, notwithstanding all his efforts to dissipate that suspicion, it was resolved to expel him from the state. On September 23, 1735, he was seized and conveyed to Ferrara. After wandering, under the assumed name of Antonio Rinaldo, for three months through Modena, Milan, and Turin, he at last reached Geneva, where he enjoyed the friendship of the most distinguished citizens, and was on excellent terms with the great publishing firms. But in an evil hour he was induced to visit a Catholic village within the Sardinian territory, where he was kidnapped by the agents of the Sardinian Government, conveyed to the castle of Miolan, and thence successively transferred to Ceva and Turin. In the fortress of Turin he remained immured during the last twelve years of his life, though part of his time was spent in composing a defense of the Sardinian interests as opposed to those of the papal court, and though he was led to sign a retraction of the statements in his history most obnoxious to the Vatican. He died March 7, 1748, in his seventy-second year.

GIANT is the Old English *geant*, derived through French and Latin from Greek *gigas* (*gigant*). The idea conveyed by the word in classic mythology is that of beings more or less manlike, but monstrous in size and strength. Figures like the Titans and the Giants whose birth from Heaven and Earth is sung by Hesiod in the *Theogony*, such as can heap up mountains to scale the sky, and war beside or against the gods, must be treated, with other like monstrous figures of the wonder-tales of the world, as belonging altogether to the realms of mythology. But there also appear in the legends of giants some with historic significance. The Bible (the English reader must be cautioned that the word giant has been there used ambiguously, from the Septuagint downward) touches the present matter in so far as it records the traditions of the Israelites of fighting in Palestine with tall races of the land such as the Anakim. When reading in Homer of "the Cyclopes and the wild tribes of the Giants," or of the adventures of Odysseus in the cave of Polyphemus, we seem to come into view of dim traditions, exaggerated through the mist of ages, of pre-Hellenic barbarians, godless, cannibal, skin-clothed, hurling huge stones in their rude warfare. Giant-legends of this class are common in Europe and Asia, where the big and stupid giants have often every token of uncouth native barbarians, exagger-

ated into monsters in the legends of the later tribes who dispossessed and slew them.

Besides the conception of giants as special races distinct from mankind, it was a common opinion of the ancients that the human race had itself degenerated, the men of primeval ages having been of so far greater stature and strength as to be in fact gigantic. This, for example, is received by Pliny, and it becomes a common doctrine of theologians such as Augustine, lasting on into times so modern that it may be found in Cruden's *Concordance*. Yet, so far as can be judged from actual remains, it does not appear that giants, in the sense of tribes of altogether superhuman stature, ever existed, or that the men of ancient time were on the whole taller than those now living. It is now usual to apply the word giant to beings not superhuman in their height, but merely the tallest men and women of our nations. In every race of mankind the great mass of individuals do not depart far from a certain mean or average height, while the very tall or very short men become less and less numerous as they depart from the mean standard, till the utmost divergence is reached in a very few giants on the one hand, and a very few dwarfs on the other. At both ends of the scale, the body is markedly out of the ordinary proportions; thus a giant's head is smaller and a dwarf's head larger than it would be if an average man had been magnified or diminished. Quetelet considers the tallest man whose stature has been authentically recorded to have been Frederick the Great's Scottish giant, who was not quite eight feet three inches. Modern statisticians, though admitting that this may not be the extreme limit of human stature, cannot accept the loose conclusion in Buffon, that there is no doubt of giants having been ten, twelve and perhaps fifteen feet high. Confidence is not even to be placed in ancient asserted measurements, as where Pliny gives to one Gabbaras, an Arabian, the stature of nine feet nine inches (about nine feet five and a half inches English), capping this with the mention of Posio and Secundilla, who were half a foot higher. That two persons should be described as having this same extraordinary measure suggests to the modern critic the notion of a note jotted down on the philosopher's tablets, and never tested afterward.

GIANT'S CAUSEWAY (deriving its name from a legend that it was the commencement of a road to be constructed by giants across the channel to Scotland) is a sort of natural pier or mole, of columnar basalt, projecting from the northern coast of Antrim, Ireland, into the North Channel, seven miles northeast of Portrush, by an electric tramway (1883). It is part of an overlying mass of basalt, from 300 to 500 feet in thickness, which covers almost the whole county of Antrim, and the eastern part of Londonderry. The basalt occurs in several beds, interstratified with protrusions of whin-dyke. Several of these beds are more or less columnar, but three layers are remarkably so. The first appears at the bold promontory of Fair Head; its columns exceed 200 feet in height. The other two are seen together rising above the sea level at Bengore Head, the lower one forming the Giant's Causeway. It is exposed for 300 yards, and exhibits an unequal pavement, formed of the tops of 40,000 vertical closely-fitting polygonal columns, which in shape are chiefly hexagonal, though examples may be found with five, seven, eight or nine sides. There is a single instance of a triangular prism. The diameter of the pillars varies from fifteen to twenty inches. Each pillar is divided into joints of unequal length, the concave hollow at the end of one division fitting exactly into the convex projection of the other. The rock is compact and homogeneous, and is somewhat sonorous when



struck with a hammer. The Grand Causeway is itself formed of three causeways, the Little, Middle, or Honeycomb, and the Grand Causeway. On the Little Causeway may be seen an octagon, pentagon, hexagon, and heptagon all together; on the Middle Causeway is the famous Wishing Chair, with two arms and a back, on a platform where the columns rise to a height of about ten feet. On the Grand Causeway are pointed out the Lady's Fan, an exact arrangement of five perfect pentagons surrounding a heptagon; the keystone of the Causeway—a sunk octagon; and the single triangle. At the starting point is the Giant's Loom, an imposing row of columns thirty feet high, each intersected by about thirty joints; to the left is the Giant's Well, to the right the Giant's Chair.

The best way to see the Causeway is to walk along it under the cliffs, and next over them, but he who would see the full grandeur of this wonderful strip of coast must row along it eastward as far as the Pleaskin. The "short course" includes a visit to Portcoon and Runkerry Caves and the Causeway only; the "long course" extends westward to the caves, and eastward to the Horseshoe Bay, beyond Pleaskin and under Benbane Head. The various inlets and points along the coast, passed in order, are Portnabo, separated by the Stookan Rocks from Portganniay; next after the Giant's Causeway proper is passed, Portnoffer, closed on the east side by the Giant's Organ, a row of imposing pillars, the appearance of which at once explains their name; after Roverin Valley Head is turned, Port Reostan, opening up into the amphitheater, fringed with cliffs 350 feet high and reaching its eastern horn in the Chimney Point, the lofty stacks of whose rocks are said to have been fatally mistaken for the chimneys of Dunluce Castle by a Spanish Armada ship. The next bay is Spanish Bay, with the Spanish Organ, shut in by Benanouran Head, 400 feet high, between which and Pleaskin Head are the reefs called the Giant's Eyeglass and the King and his Nobles. The Pleaskin rises to a height of 400 feet, and is the noblest of all the Causeway cliffs. The prospect is unrivaled from Hamilton's Seat near its top, so named from the Rev. Doctor Hamilton of Derry, one of the first to discover the Causeway (1786). Beyond it is the Horseshoe Harbor and the group of rocks called the Nurse and Child. After rounding Benbane Head we come in sight of Bengore Head (367 feet), below which the coast slopes more rapidly southward past the pillars known as the Four Sisters, the Giant's Peep-hole, and the Giant's Granny, to the ruins of Dunseverick Castle.

GIANTS' KETTLES, the name given in Norway to vertical, pot-shaped, smooth-sided hollows excavated in rocks, usually filled up with rounded boulders, water-worn stones, gravel, and other detritus. They are believed to have originated under the great glaciers or continuous *mer de glacé*, which formerly covered wide regions of northern Europe. They have probably been formed by water descending from the surface of the ice through *moulins* or glacial chimneys, setting stones and boulders in rapid rotation. They are thus comparable to the pot-holes which are so common a feature in the beds of rapid streams, particularly in the neighborhood of waterfalls where the stones have a gyratory motion imparted to them by the irregular movements of the water. As they rotate they gradually wear away the rock, and produce more or less steep-sided cavities. Giants' kettles occur in connection with the glacial deposits of many other countries besides Norway, as, for example, in Prussia.

GIARRE, a town of Sicily, in the province of Catania, between Etna and the sea, with a station on the railway from Messina to Catania, distant from the

former forty miles, and from the latter nearly nineteen.

GIAVENO, a market-town of Italy, in the province of Turin, and circondario of Susa, about sixteen miles west of Turin, at the foot of the Cottian Alps, and on the left bank of the Sangone, a headwater of the Po.

GIB, ADAM, the leader of the Antiburgher section of the Scottish Secession Church, was born 1714, in the parish of Muckhart, Perthshire, and, on the completion of his literary and theological studies at Edinburgh and Perth, was licensed as a preacher in 1740. In the following year he was ordained minister of the large Secession congregation of Bristo, Edinburgh, being the first in the city inducted into such a charge; and there his powerful intellect and his intensity of character soon secured for him a position of considerable prominence. In 1742 he caused some stir by the publication of an invective entitled *A warning against countenancing the ministrations of Mr. George Whitefield*; and in 1745 he was almost the only minister of Edinburgh who continued to preach, and to preach against rebellion, while the troops of Charles Edward were in occupation of the town. When, in 1747, "the Associate Synod," by a narrow majority, decided not to give full immediate effect to a judgment which had been passed in the previous year against the lawfulness of the "Burgess Oath," Gib led the protesting minority, who forthwith separated from their brethren and formed the Antiburgher Synod. It was chiefly under his influence that it was agreed by this ecclesiastical body at subsequent meetings to summon to the bar their "Burgher" brethren, and finally to depose and excommunicate them for contumacy. In 1765 he made a vigorous and able reply to the General Assembly of the Church of Scotland, which had stigmatized the Secession as "threatening the peace of the country;" and this apology was further developed in his *Display of the Secession Testimony*, published in 1774. From 1753 (when after protracted litigation he was compelled to leave the Bristo church) till within a short period of his death, which took place June 18, 1788, he preached regularly in Nicolson Street church, which is said to have been filled every Sunday with an audience of 2,000 persons.

GIBBON (*Hylobates*), a genus of tailless anthropoid apes, natives of the East Indies. They are nearly allied to the oranges and chimpanzees, but are of more slender form, and their arms are so long as almost to reach the ground when they are placed in an erect posture; there are also naked collosities on the buttocks. In this respect they differ from the other anthropoid apes, and are allied to some of the catarrhini; in other respects also the gibbons are the lowest among the anthropoid apes, and connect them with the catarrhini. The gibbons are inhabitants of forests, their long arms enabling them to swing themselves from bough to bough, which they do to wonderful distances, and with extreme agility. They cannot, however, move with ease or rapidity on the ground. The conformation of the hinder extremities adds to their difficulty in this, while it increases their adaptation to a life among the branches of trees, the soles of the feet being much turned inward. None of the gibbons are of a large size. There are some eight or ten species. The common gibbon or Lar gibbon (*H. lar*) is found in some parts of India, and in more eastern regions. The active gibbon (*H. agilis*), found in Sumatra, is particularly remarkable for the power which it displays of flinging itself from one tree to another, clearing at once, it is said, a distance of forty feet. The Wow-wow (*H. leuciscus*) is a gibbon found in Malacca and the Sundy Isles. *H. leucogenys* is from Siam. The Hoolock (*H. Hoolock*) is a native of the Garro Hills. The Siamang (*H. Syndac-*



*tylus*), a Sumatran species, differs from the rest of the genus in having the first and second fingers of the hinder extremities united together up to the second joint; it resembles the orang and differs from the true gibbons in having a large air sac opening into the windpipe. All the gibbons are of gentle disposition and easily domesticated. At present the gibbons are confined to south-eastern Asia and some of the larger islands bordering upon the continent, but it is possible that *Dryopithecus* found fossil in tertiary strata of the south of France, of the size of a man, is referable to the same group.

GIBBON, EDWARD, one of the most celebrated historians of any age or country, was also his own historian. He has left us one of the most piquant autobiographies ever written.

The historian was born at Putney, Surrey, April 27 (Old Style), 1737. His mother, Judith Porten, was the daughter of a London merchant. He was the eldest of a family of six sons and a daughter, and the only one who survived childhood; his own life in youth hung by so mere a thread as to be again and again despaired of. His mother, between domestic cares and constant infirmities (which, however, did not prevent an occasional plunge into fashionable dissipation in compliance with her husband's wishes), did but little for him. The "true mother of his mind as well as of his health" was a maiden aunt—Catherine Porten by name—with respect to whom he expressed himself in language of the most grateful remembrance.

In his ninth year (1746), during a "lucid interval of comparative health," he was sent to a school at Kingston-upon-Thames; but his former infirmities soon returned, and his progress, by his own confession, was slow and unsatisfactory. "By the common methods of discipline, at the expense of many tears and some blood, I purchased the knowledge of the Latin syntax," but manifestly, in his own opinion, the *Arabian Nights*, Pope's *Homer*, and Dryden's *Virgil*, eagerly read, had at this period exercised a much more powerful influence on his intellectual development than Phædrus and Cornelius Nepos, "painfully construed and darkly understood."

In December, 1747, his mother died, and he was taken home. After a short time his father removed to the "rustic solitude" of Buriton (Hants), but young Gibbon lived chiefly at the house of his maternal grandfather, at Putney, where, under the care of his devoted aunt, he developed, he tells us, that passionate love of reading "which he would not exchange for all the treasures of India," and where his mind received its most decided stimulus. In 1749, in his twelfth year, he was sent to Westminster, still residing, however, with his aunt, who, rendered destitute by her father's bankruptcy, but unwilling to live a life of dependence, had opened a boarding-house for Westminster school. Here in the course of two years (1749-50), interrupted by danger and debility, he "painfully climbed into the third form;" but it was left to his riper age to "acquire the beauties of the Latin and the rudiments of the Greek tongue." The continual attacks of sickness which had retarded his progress induced his aunt, by medical advice, to take him to Bath; but the mineral waters had no effect. He then resided for a time in the house of a physician at Winchester; the physician did as little as the mineral waters; and, after a further trial of Bath, he once more returned to Putney, and made a last futile attempt to study at Westminster. Finally, it was concluded that he would never be able to encounter the discipline of a school; and casual instructors, at various times and places, were provided for him. Meanwhile his indiscriminate appetite for reading had begun to fix itself more and more decidedly upon history; and the

list of historical works devoured by him during this period of chronic ill-health is simply astonishing. His first introduction to the historic scenes, the study of which afterward formed the passion of his life, took place in 1751, when, while along with his father visiting a friend in Wiltshire, he discovered in the library "a common book, the continuation of Echard's *Roman History*." "To me the reigns of the successors of Constantine were absolutely new; and I was immersed in the passage of the Goths over the Danube, when the summons of the dinner-bell reluctantly dragged me from my intellectual feast." Soon afterward his fancy kindled with the first glimpses into Oriental history, the wild "barbaric" charm of which he never ceased to feel. Ockley's book on the Saracens "first opened his eyes" to the striking career of Mahomet and his hordes; and with his characteristic ardor of literary research, after exhausting all that could be learned in English of the Arabs and Persians, the Tartars and Turks, he forthwith plunged into the French of D'Herbelot, and the Latin of Pocock's version of Abulfaragius, sometimes understanding them, but oftener only guessing their meaning.

Toward his sixteenth year he tells us "nature displayed in his favor her mysterious energies," and all his infirmities suddenly vanished. Thenceforward, while never possessing or abusing the insolence of health, he could say, "few persons have been more exempt from real or imaginary ills." His unexpected recovery revived his father's hopes for his education, hitherto so much neglected if judged by ordinary standards; and, accordingly in January, 1752, he was placed at Esher, Surrey, under the care of Doctor Francis, the well-known translator of Horace. But Gibbon's friends in a few weeks discovered that the new tutor preferred the pleasures of London to the instruction of his pupils, and in this perplexity decided to send him prematurely to Oxford, where he was matriculated as a gentleman commoner of Magdalen College, April 3, 1752. According to his own testimony, he arrived at the university "with a stock of information which might have puzzled a doctor, and a degree of ignorance of which a school-boy might be ashamed." And indeed his huge wallet of scraps stood him in little stead at the trim banquets to which he was invited at Oxford, while the wandering habits by which he had filled it absolutely unfitted him to be a guest. He was not well grounded in any of the elementary branches, which are essential to university studies, and to all success in their prosecution. It was natural, therefore, that he should dislike the university, and as natural that the university should dislike him. Many of his complaints of the system were perfectly just; but it may be doubted whether any university system would have been profitable to him, considering his antecedents. He complains especially of his tutors, and in one case with abundant reason; but, by his own confession, they might have recriminated with justice, for he indulged in gay society, and kept late hours. His observations, however, on the defects of the English university system, some of which have only very recently been removed, are acute and well worth pondering, however little relevant to his own case. He remained at Magdalen about fourteen months. "To the university of Oxford," he says, "I acknowledge no obligation; and she will as cheerfully renounce me for a son as I am willing to disclaim her for a mother. I spent fourteen months at Magdalen College; they proved the fourteen months the most idle and unprofitable of my whole life."

But thus "idle" though he may have been as a "student," he already meditated authorship. In the first long vacation—during which he, doubtless with some



sarcasm, says that "his taste for books began to revive"—he contemplated a treatise on the age of Sesostris, in which (and it was characteristic) his chief object was to investigate not so much the events as the probable epoch of the reign of that semi-mythical monarch, whom he was inclined to regard as having been contemporary with Solomon. "Unprovided with original learning, unformed in the habits of thinking, unskilled in the arts of composition, I resolved to write a book;" but the discovery of his own weakness, he adds, was the first symptom of taste. On his first return to Oxford the work was "wisely relinquished," and never afterward resumed. The most memorable incident, however, in Gibbon's stay at Oxford was his temporary conversion to the doctrines of the church of Rome. The bold criticism of Middleton's recently (1749) published *Free Enquiry into the Miraculous Powers which are supposed to have subsisted in the Christian Church*, appears to have given the first shock to his Protestantism, not indeed by destroying his previous belief that the gift of miraculous powers had continued to subsist in the church during the first four or five centuries of Christianity, but by convincing him that within the same period most of the leading doctrines of popery had been already introduced both in theory and in practice. At this stage he was introduced by a friend (Mr. Molesworth) to Bossuet's *Variations of Protestantism, and Exposition of Catholic Doctrine*. "These works," says he, "achieved my conversion, and I surely fell by a noble hand." In bringing about this "fall," however, Parsons, the Jesuit appears to have had a considerable share; at least Lord Sheffield has recorded that on the only occasion on which Gibbon talked with him on the subject he imputed the change in his religious views principally to that vigorous writer, who, in his opinion, had urged all the best arguments in favor of Roman Catholicism. But be this as it may, he had no sooner adopted his new creed than he resolved to profess it; "a momentary glow of enthusiasm" had raised him above all temporal considerations, and accordingly, on June 8, 1753, he records that having "privately abjured the heresies" of his childhood before a Catholic priest of the name of Baker, a Jesuit, in London, he announced the same to his father in an elaborate controversial epistle which his spiritual adviser much approved, and which he himself afterward described to Lord Sheffield as having been "written with all the pomp, the dignity, and self-satisfaction of a martyr."

The elder Gibbon heard with indignant surprise of this act of juvenile apostasy, and, indiscreetly giving vent to his wrath, precipitated the expulsion of his son from Oxford, a punishment which the culprit, in after years at least, found no cause to deplore. That his conversion was sincere at the time, that it marked a real if but a transitory phase of genuine religious conviction, we have no reason to doubt, notwithstanding the skepticism he has himself expressed. Nor is the sincerity of the Catholicism he professed in these boyish days in any way discredited by the fact of his subsequent lack of religion. Indeed, as one of the acutest and most sympathetic of his critics has remarked, the deep and settled grudge he has betrayed toward every form of Christian belief, in all the writings of his maturity, may be taken as evidence that he had at one time experienced in his own person at least some of the painful workings of a positive faith.

But little time was lost by the elder Gibbon in the formation of a new plan of education for his son, and in devising some method which if possible might effect the cure of his "spiritual malady." The result of deliberation, aided by the advice and experience of

Lord Eliot, was that it was almost immediately decided to fix Gibbon for some years abroad under the roof of M. Pavilliard, a Calvinist minister at Lausanne. In as far as regards the instructor and guide thus selected, a more fortunate choice could scarcely have been made. From the testimony of his pupil, and the still more conclusive evidence of his own correspondence with the father, Pavilliard seems to have been a man of singular good sense, temper and tact. At the outset, indeed, there was one considerable obstacle to the free intercourse of tutor and pupil: M. Pavilliard appears to have known little of English, and young Gibbon knew practically nothing of French. But this difficulty was soon removed by the pupil's diligence; the very exigencies of his situation were of service to him in calling forth all his powers, and he studied the language with such success that at the close of his five years' exile he declares that he "spontaneously thought" in French rather than in English, and that it had become more familiar to "ear, tongue and pen." It is well known that in after years he had doubts whether he should not compose his great work in French; and it is certain that his familiarity with that language, in spite of considerable efforts to counteract its effects, tinged his style to the last.

Under the judicious regulations of his new tutor a methodical course of reading was marked out, and most ardently prosecuted; the pupil's progress was proportionably rapid. With the systematic study of the Latin, and to a slight extent also of the Greek classics, he conjoined that of logic in the prolix system of Crousaz; and he further invigorated his reasoning powers, as well as enlarged his knowledge of metaphysics and jurisprudence, by the perusal of Locke, Grotius, and Montesquieu. He also read largely, though somewhat indiscriminately, in French literature, and appears to have been particularly struck with Pascal's *Provincial Letters*, which he tells us he reperused almost every year of his subsequent life with new pleasure and which he particularly mentions as having been, along with Bleterie's *Life of Julian* and Giannone's *History of Naples*, a book which probably contributed in a special sense to form the historian of the Roman empire.

Under the new influences which were brought to bear on him, he in less than two years resumed his Protestantism. "He is willing," he says, to allow M. Pavilliard a "handsome share in his reconversion," though he maintains, and no doubt rightly, that it was principally due "to his own solitary reflections." He particularly congratulated himself on having discovered the "philosophical argument" against transubstantiation, "that the text of Scripture which seems to inculcate the real presence is attested only by a single sense—our sight, while the real presence itself is disproved by three of our senses—the sight, the touch, and the taste." Before a similar mode of reasoning, all the other distinctive articles of the Romish creed "disappeared like a dream;" and "after a full conviction," on Christmas day, 1754, he received the sacrament in the church of Lausanne.

With all his devotion to study at Lausanne (he read ten or twelve hours a day), he still found some time for the acquisition of some of the lighter accomplishments, such as riding, dancing, drawing, and also for mingling in such society as the place had to offer. The last eighteen months of his residence abroad saw the infusion of two new elements—one of them at least of considerable importance—into his life. In 1757 Voltaire came to reside at Lausanne; and although he took but little notice of the young Englishman of twenty, who eagerly sought and easily obtained an introduction, the estab-



lishment of the theater at Monrepos, where the brilliant versifier himself declaimed before select audiences his own productions on the stage, had no small influence in fortifying Gibbon's taste for the French theater, and in at the same time abating that "idolatry for the gigantic genius of Shakespeare which is inculcated from our infancy as the first duty of an Englishman." In the same year—apparently about June—he saw for the first time, and forthwith loved, the beautiful, intelligent, and accomplished Mademoiselle Susan Curchod, daughter of the pasteur of Crassier. That the passion which she inspired in him was tender, pure, and fitted to raise to a higher level a nature which in some respects was much in need of such elevation will be doubted by none but the hopelessly cynical; and probably there are few readers who can peruse the paragraph in which Gibbon "approaches the delicate subject of early love" without discerning in it a pathos much deeper than that of which the writer was himself aware. During the remainder of his residence at Lausanne he had good reason to "indulge his dream of felicity;" but on his return to England, "I soon discovered that my father would not hear of this strange alliance, and that without his consent I was myself destitute and helpless. After a painful struggle I yielded to my fate; I sighed as a lover, I obeyed as a son; my wound was insensibly healed by time, absence, and the habits of a new life."

In 1758 he returned with mingled joy and regret to England, and was kindly received at home. But he found a stepmother there; and this apparition on his father's hearth at first rather appalled him. The cordial and gentle manners of Mrs. Gibbon, however, and her unremitting care for his happiness, won from him his first prejudices, and gave her a permanent place in his esteem and affection.

His father's library, though large in comparison with that he commanded at Lausanne, contained, he says, "much trash;" but a gradual process of reconstruction transformed it at length into that "numerous and select" library which was "the foundation of his works, and the best comfort of his life both at home and abroad." No sooner had he returned home than he began the work of accumulation, and records that, on the receipt of his first quarter's allowance, a large share was appropriated to his literary wants. It may not be uninteresting here to note the principles which guided him both now and afterward in his literary purchases. "I am not conscious," says he, "of having ever bought a book from a motive of ostentation; every volume, before it was deposited on the shelf, was either read or sufficiently examined;" he also mentions that he soon adopted the tolerating maxim of the elder Pliny, that no book is ever so bad as to be absolutely good for nothing.

In 1761 Gibbon, at the age of twenty-four, after many delays, and with many flutterings of hope and fear, gave to the world, in French, his maiden publication, an *Essai sur l'Étude de la Littérature*, which he had composed two years before. It was published partly in compliance with his father's wishes, who thought that the proof of some literary talent might introduce him favorably to public notice, and secure the recommendation of his friends for some appointment in connection with the mission of the English plenipotentiaries to the congress at Augsburg which was at that time in contemplation. But, in yielding to paternal authority, Gibbon frankly owns that he "complied, like a pious son, with the wish of his own heart."

The subject of this youthful effort was suggested, its author says, by a refinement of vanity—"the desire of justifying and praising the object of a favorite pursuit," namely, the study of ancient literature. Partly owing to its being written in French, partly to its character,

the *Essai* excited more attention abroad than at home. Gibbon has criticised it with the utmost frankness, not to say severity; but, after every abatement, it is unquestionably a surprising effort for a mind so young, and contains many thoughts which would not have disgraced a thinker or a scholar of much maturer age.

Some time before the publication of the essay, Gibbon had entered a new, and, one might suppose, a very uncongenial scene of life. In an hour of patriotic ardor he became (June 12, 1759) a captain in the Hampshire militia, and for more than two years (May 10, 1760, to December 23, 1763) led a wandering life of "military servitude." Hampshire, Kent, Wiltshire, and Dorsetshire formed the successive theaters of what he calls his "bloodless and inglorious campaigns." He complains of the busy idleness in which his time was spent; but, considering the circumstances, so adverse to study, one is rather surprised that the military student should have done so much, than that he did so little; and never probably before were so many hours of literary study spent in a tent. In estimating the comparative advantages and disadvantages of this wearisome period of his life, he has summed up with the impartiality of a philosopher and the sagacity of a man of the world.

It was during this period that he read Homer and Longinus, having for the first time acquired some real mastery of Greek; and after the publication of the *Essai*, his mind was full of projects for a new literary effort. The Italian expedition of Charles VIII. of France, the crusade of Richard I., the wars of the barons, the lives and comparisons of Henry V. and the emperor Titus, the history of the Black Prince, the life of Sir Philip Sydney, that of Montrose, and finally that of Sir W. Raleigh, were all of them seriously contemplated and successively rejected. By their number they show how strong was the impulse to literature, and by their character, how determined the bent of his mind in the direction of history; while their variety makes it manifest also that he had then at least no special purpose to serve, no preconceived theory to support, no particular prejudice or belief to overthrow.

The militia was disbanded in 1762, and Gibbon joyfully shook off his bonds; but his literary projects were still to be postponed. Following his own wishes, though with his father's consent, he had early in 1760 projected a continental tour as his completion "of an English gentleman's education." This had been interrupted by the episode of the militia; now, however, he resumed his purpose, and left England in January, 1763. Two years were "loosely defined as the term of his absence," which he exceeded by half a year—returning June, 1765. He first visited Paris, where he saw a good deal of D'Alembert, Diderot, Barthélemy, Raynal, Helvétius, Baron d'Holbach, and others of that circle, and was often a welcome guest in the saloons of Madame Geoffrin and Madame du Deffand. Voltaire was at Geneva, Rousseau at Montmorency, and Buffon he neglected to visit; but so congenial did he find the society for which his education had so well prepared him, and into which some literary reputation had already preceded him, that he declared, "Had I been rich and independent, I should have prolonged and perhaps have fixed my residence at Paris."

From France he proceeded to Switzerland, and spent nearly a year at Lausanne, where many old friendships and studies were resumed, and new ones begun. His reading was largely designed to enable him fully to profit by the long contemplated Italian tour which began in April, 1764, and lasted somewhat more than a year. He has recorded one or two interesting notes on Turin, Genoa, Florence, and other towns at which halt was made on his route; but Rome was the great



object of his pilgrimage, and the words in which he has alluded to the feelings with which he approached it are such as cannot be omitted from any sketch of Gibbon, however brief. "My temper is not very susceptible of enthusiasm, and enthusiasm which I do not feel I have ever scorned to affect. But at the distance of twenty-five years I can neither forget nor express the strong emotions which agitated my mind as I first approached and entered the Eternal City. After a sleepless night, I trod with a lofty step the ruins of the forum; each memorable spot, where Romulus stood, or Tully spoke, or Cæsar fell, was at once present to my eye; and several days of intoxication were lost or enjoyed before I could descend to a cool and minute investigation." Here at last his long yearning for some great theme worthy of his historic genius was gratified. The first conception of the *Decline and Fall* arose as he lingered one evening amidst the vestiges of ancient glory. "It was at Rome, on October 15, 1764, as I sat musing amidst the ruins of the Capitol, while the bare-footed friars were singing vespers in the temple of Jupiter, that the idea of writing the decline and fall of the city first started to my mind."

The five years and a half which intervened between his return from this tour, in June, 1765, and the death of his father in November, 1770, seemed to have formed the portion of his life which "he passed with the least enjoyment and remembered with the least satisfaction." He attended, every spring, the meetings of the militia at Southampton, and rose successively to the rank of major and lieutenant-colonel commandant; but was each year "more disgusted with the inn, the wine, the company, and the tiresome repetition of the annual attendance and daily exercise." From his own account, however, it appears that other and deeper causes produced this discontent. Sincerely attached to his home, he yet felt the anomaly of his position. At thirty, still a dependant, without a settled occupation, without a definite social status, he often regretted that he had not "embraced the lucrative pursuits of the law or of trade, the chances of civil office or India adventure, or even the fat slumbers of the church." From the emoluments of a profession he "might have derived an ample fortune, or a competent income, instead of being stinted to the same narrow allowance, to be increased only by an event which he sincerely deprecated." Doubtless the secret fire of a consuming, but as yet ungratified, literary ambition, also troubled his repose. He was still contemplating, "at an awful distance," *The Decline and Fall*, and meantime revolved some other subjects, that seemed more immediately practicable. Hesitating for some time between the revolutions of Florence and those of Switzerland, he consulted M. Deyverdun, a young Swiss with whom he had formed a close and intimate friendship during his first residence at Lausanne, and finally decided in favor of the land which was his "friend's by birth" and "his own by adoption." He executed the first book in French; it was read (in 1767), as an anonymous production, before a literary society of foreigners in London, and condemned. Gibbon sat and listened unobserved to their strictures. It never got beyond that rehearsal; Hume, indeed, approved of the performance, only deprecating as unwise the author's preference for French; but Gibbon sided with the majority.

In 1776 also, he joined with M. Deyverdun in starting a literary journal under the title of *Mémoires Littéraires de la Grande Bretagne*. But its circulation was limited, and only the second volume had appeared (1768) when Deyverdun went abroad. The materials already collected for a third volume were suppressed. It is interesting, however, to know that in the first volume is a

review by Gibbon of Lord Lyttelton's *History of Henry II.*, and that the second volume contains a contribution by Hume on Walpole's *Historic Doubts*.

The next appearance of the historian made a deeper impression. It was the first distinct print of the lion's foot. He attacked, and attacked successfully, the redoubtable Warburton. Of the many paradoxes in the *Divine Legation*, few are more extravagant than the theory that Virgil, in the sixth book of his *Æneid*, intended to allegorize, in the visit of his hero and the Sibyl to the shades, the initiation of Æneas, as a law-giver, into the Eleusinian mysteries. This theory Gibbon completely exploded in his *Critical Observations* (1770)—no very difficult task, indeed, but achieved in a style, and with a profusion of learning, which called forth the warmest commendations both at home and abroad. Warburton never replied; and few will believe that he would not, if he had not thought silence more discreet.

Soon after his "release from the fruitless task of the Swiss revolution" in 1768, he had gradually advanced from the wish to the hope, from the hope to the design, from the design to the execution of his great historical work. His preparations were indeed vast. The classics, "as low as Tacitus, Pliny the Younger, and Juvenal," had been long familiar. He now "plunged into the ocean of the Augustan history," and "with pen almost always in hand," pored over all the original records, Greek and Latin, between Trajan and the last of the Western Cæsars. The Christian apologists and their pagan assailants; the Theodosian Code, with Godefroy's commentary; the *Annals and Antiquities* of Muratori, collated with "the parallel or transverse lines" of Sigonius and Maffei, Pagi and Baronius, were all critically studied. He deepened and extended his acquaintance with Greek, particularly with his favorite authors Homer and Xenophon; and, to crown all, he succeeded in achieving the third perusal of Blackstone's *Commentaries*.

The course of his study was for some time seriously interrupted by his father's illness and death in 1770, and by the many distractions connected with the transference of his residence from Buriton to London. It was not, indeed, until October, 1772, that he found himself at last independent, and fairly settled in his house and library, with full leisure and opportunity to set about composition of the first volume of his history. Even then it appears from his own confession that he long brooded over the chaos of materials he had amassed before light dawned upon it. At the commencement, he says, "all was dark and doubtful;" the limits, divisions, even the title of his work were undetermined; the first chapter was composed three times, and the second and third twice, before he was satisfied with his efforts. This prolonged meditation on his design and its execution was ultimately well repaid by the result; so methodical did his ideas become, and so readily did his materials shape themselves, that, with the above exceptions, the original MS. of the entire six quartos was sent uncopied to the printers. He also says that not a sheet had been seen by any other eyes than those of author and printer, a statement, indeed, which must be taken with a small deduction; or rather we must suppose that a few chapters had been submitted, if not to the "eyes," to the "ears" of others; for he elsewhere tells us that he was "soon disgusted with the modest practice of reading the manuscript to his friends." Such, however, were his preliminary difficulties that he confesses he was often "tempted to cast away the labor of seven years;" and it was not until February, 1776, that the first volume was published. The success was instant, and, for a quarto, probably unprece-



dented. The entire impression was exhausted in a few days; a second and a third edition were scarcely adequate to the demand. The author might almost have said, as Lord Byron after the publication of *Childe Harold*, that "he awoke one morning and found himself famous."

Two years before the publication of this first volume Gibbon was elected member of parliament for Liskeard (1774). His political duties did not suspend his prosecution of his history, except on one occasion, and for a little while, in 1779, when he undertook, on behalf of the ministry, a task which, if well performed, was also, it must be added, well rewarded. The French Government had issued a manifesto preparatory to a declaration of war, and Gibbon was solicited by Chancellor Thurlow and Lord Weymouth, secretary of state, to answer it. In compliance with this request he produced the able *Mémoire Justificatif*, composed in French, and delivered to the courts of Europe; and shortly afterward he received a seat at the Board of Trade and Plantations—little more than a sinecure in itself, but with a very substantial salary of nearly £800 per annum.

In April, 1781, the second and third quartos of his *History* were published. They excited no controversy, and were comparatively little talked about—so little, indeed, as to have extorted from him a half murmur about "coldness and prejudice." The volumes, however, were bought and read with silent avidity. Meanwhile public events were developing in a manner that had a considerable influence upon the manner in which the remaining years of the historian's life were spent. At the general election in 1780 he had lost his seat for Liskeard, but had subsequently been elected for Lymington. The ministry of Lord North, however, was tottering, and soon after fell; the Board of Trade was abolished by the passing of Burke's bill in 1782, and Gibbon's salary vanished with it—no trifle, for his expenditure had been for three years on a scale somewhat disproportionate to his private fortune. He did not like to depend on statesmen's promises, which are proverbially uncertain of fulfillment; he as little liked to retrench; and he was wearied of parliament, where he had never given any but silent votes. Urged by such considerations, he once more turned his eyes to the scene of his early exile, where he might live on his decent patrimony in a style which was impossible in England, and pursue unembarrassed his literary studies. He therefore resolved to fix himself at Lausanne.

Having sold all his property except his library—to him equally a necessity and a luxury—Gibbon repaired to Lausanne in September, 1783, and took up his abode with his early friend Deyverdun, now a resident there. Perfectly free from every engagement but those which his own tastes imposed, easy in his circumstances, commanding just as much society, and that as select, as he pleased, with the noblest scenery spread out at his feet, no situation can be imagined more favorable for the prosecution of his literary enterprise; a hermit in his study as long as he chose, he found the most delightful recreation always ready for him at the threshold.

When once fairly reseated at his task, he proceeded in this delightful retreat, leisurely, yet rapidly, to its completion. The fourth volume, partly written in 1782, was completed in June, 1784; the preparation of the fifth volume occupied less than two years; while the sixth and last, begun May 18, 1786, was finished in thirteen months. The feelings with which he brought his labors to a close must be described in his own inimitable words: "It was on the day, or rather night, of the 27th of June, 1787, between the hours of eleven and twelve, that I wrote the last lines of the last page in a

summer-house in my garden. After laying down my pen, I took several turns in a *berceau*, or covered walk of acacias, which commands a prospect of the country, the lake and the mountains. The air was temperate, the sky serene, the silver orb of the moon was reflected from the waters, and all nature was silent. I will not dissemble the first emotions of joy on the recovery of my freedom, and, perhaps, the establishment of my fame. But my pride was soon humbled, and a sober melancholy was spread over my mind by the idea that I had taken an everlasting leave of an old and agreeable companion, and that, whatsoever might be the future date of my *History*, the life of the historian must be short and precarious."

Taking the manuscript with him, Gibbon, after an absence of four years, once more visited London in 1787; and the fifty-first anniversary of the author's birthday (April 27, 1788), witnessed the publication of the last three volumes of *The Decline and Fall*. They met with a quick and easy sale, were very extensively read, and very liberally and deservedly praised for the unflagging industry and vigor they displayed, though just exception, if only on the score of good taste, was taken to the scoffing tone he continued to maintain in all passages where the Christian religion was specially concerned, and much fault was found with the indecency of some of his notes.

He returned to Switzerland in July, 1788, cherishing vague schemes of fresh literary activity; but genuine sorrow caused by the death of his friend Deyverdun interfered with steady work, nor was it easy for him to fix on a new subject which should be at once congenial and proportioned to his powers; while the premonitory mutterings of the great thunderstorm of the French Revolution, which reverberated in hollow echoes even through the quiet valleys of Switzerland, further troubled his repose. For some months he found amusement in the preparation of the delightful *Memoirs* (1789) from which most of our knowledge of his personal history is derived; but his letters to friends in England, written between 1788 and 1793 occasionally betray a slight but unmistakable tone of *ennui*. In April, 1793, he unexpectedly received tidings of the death of Lady Sheffield; and the motive of friendship thus supplied combined with the pressure of public events to urge him homeward. He arrived in England on the following June, and spent the summer at Sheffield Place, where his presence was even more highly prized than it had ever before been. Returning to London early in November, he found it necessary to consult his physicians for a symptom which, neglected since 1761, had gradually become complicated with hydrocele, and was now imperatively demanding surgical aid; but the painful operations which had to be performed did not interfere with his customary cheerfulness, nor did they prevent him from paying a Christmas visit to Sheffield Place. Here, however, fever made its appearance; and a removal to London (January 6, 1794), was considered imperative. Another operation brought him some relief; but a relapse occurred during the night of the 15th, and on the following day he peacefully breathed his last. His remains were laid in the burial place of the Sheffield family, Fletching, Sussex, where an epitaph by Doctor Parr describes his character and work in the language at once of elegance, of moderation and of truth.

The personal appearance of Gibbon as a lad of sixteen is brought before us somewhat dimly in M. Pavilliard's description of the "thin little figure, with a large head, disputing and arguing, with the greatest ability, all the best arguments that had ever been used in favor of popery." What he afterward became has been made



more vividly familiar by the clever silhouette prefixed to the *Miscellaneous Works* (Gibbon himself, at least, we know, did not regard it as a caricature), and by Sir Joshua Reynolds' portrait so often engraved. It is hardly fair perhaps to add a reference to Suard's highly-colored description of the short Silenus-like figure, not more than fifty-six inches in height, the slim legs, the large turned-in feet, the shrill piercing voice; but almost every one will remember, from Croker's *Boswell*, Colman's account of the great historian "tapping his snuff-box, smirking and smiling, and rounding his periods" from that mellifluous mouth.

The history of Rome is, for the many centuries which Gibbon treats, the history of the world; and it is nothing less than astonishing that he should have been able to work with so much ease the vast and incongruous materials into such a unity of design. It is the amplest historic canvas ever spread, the largest historic painting ever executed by a single hand; and only a comprehensive and orderly intellect of the highest rank could have grappled, as Gibbon has done, with the task of blending that vast array of nations, in all their varieties of costume, habit, language and religion into one picturesque and harmonious whole. If Gibbon had ever been conscious of any inexactitude in his mental habit, it was a defect which he very early and very successfully remedied. No man could declare more honestly than he that "curiosity as well as duty had led him carefully to examine all the original documents that could illustrate the subjects which he had undertaken to treat." With incredible labor he was able to bring at last to his great life-work a mind capable equally of ascending to the most comprehensive, and of descending to the most minute surveys; of appreciating the beautiful and sublime in classic literature, and of delighting in the verbal criticism, the tedious collation, and dry antiquarian research by which the text is established or illustrated; of celebrating the more imposing events of history with congenial pomp of description, and of investigating, with the dullest plodder's patience and perseverance, the origin of nations, the emigration of obscure tribes, and the unpromising, yet instructive, problems which ethnology presents. In his pages the widest deductions of historic philosophy alternate with attempts to fix the true reading of an obscure passage, or a minute point of chronology or geography. It may even be said that in these last investigations he took almost as much delight as in depicting the grander scenes of history, and surrendered himself as absolutely for the time to the migrations of the Goths and Scythians as to the campaigns of Belisarius, or the conquests of the Saracens. Never has historian evinced greater logical sagacity in making comparatively obscure details yield important inferences, or held with firmer hand the balance in the case of conflicting probabilities; by no one has sounder judgment or greater self-control been, on the whole, more uniformly exhibited in cases where it is so easy for learned enthusiasm to run into fanciful hypotheses.

While thus entitled to great and manifold praise *The Decline and Fall* has not been, and can never be, exempt from a certain measure of just censure. Even when the occasional Gallicisms and grammatical absurdities pointed out by the industry of critics have been willingly overlooked, there yet remains something to be said on the defects of its style. Precise, energetic, massive it is; splendid, when the pictorial demands of the narrative require it, as that of Livy; and sometimes, where profound reflections are to be concisely expressed, as sententious and graphic as that of Tacitus. But, with all its great merits, it is too often formal and inflexible, and is apt to pall on the ear by the too frequent recurrence of the same cadence at equal intervals.

and the too unsparing use of antithesis. It is not veined marble, but an exquisite tessellation; not the fluent naturally-winding stream, but a stately aqueduct, faced with stone, adorned with wooded embankments, or flowing over noble arches, but an aqueduct still. It is a just criticism of Sir James Mackintosh that probably no great writer ever derived less benefit from his professed models. Pascal, Voltaire, Hume, were his delight; and he acknowledges, as so unsuccessful a pupil well might, that he often closed the pages of the last with a feeling of despair. Addison and Swift he read for the very purpose of improving his acquaintance with the idiomatic English, yet, as the above critic remarks, "with so little success, that in the very act of characterizing these writers, he has deviated not a little from that beautiful simplicity which is their peculiar distinction."

GIBBONS, GRINLING, an eminent English sculptor and wood carver, was born at Rotterdam, April 4, 1648. Of English descent, probably, he had for some time practiced his art in England, when Evelyn found him carving on wood Tintoretto's *Crucifixion*, and on Evelyn's recommendation he was appointed by Charles II. to a place in the Board of Works, and employed in the ornamental carving of the choir of the chapel at Windsor. His works display great taste and delicacy of finish, and his flowers and foliage have almost the lightness of nature. For the choir of St. Paul's, London, he executed the foliage and festoons, and those in lime tree which decorate the side aisles. At Chatsworth, at Burleigh, at Southwick, Hampshire, and other mansions of the English nobility, he executed an immense quantity of carved embellishment; the ceiling of a room at Petworth is regarded as his *chef-d'œuvre*. He also produced several fine pieces in marble and bronze. Among these are the statue of James II., at Whitehall; the base of the statue of Charles I., at Charing Cross; and that of Charles II., at the Bank of England. He died in London, August 3, 1721.

GIBBONS, ORLANDO, one of the greatest of English musicians, was born at Cambridge in 1583, and was probably brought up in the choir of one of the college chapels. His elder brothers, Edward and Ellis, were both eminent organists and composers. The chief events of Gibbons' short life are soon told. On March 24, 1604, he was appointed organist to the Chapel Royal, London. In 1606 he took the degree of Mus. Bac. at Cambridge, and in 1622, at the instance of Camden, that of Mus. Doc. at Oxford. His exercise was the well-known eight-part anthem, "O Clap Your Hands." In 1623 he became organist at Westminster Abbey. In May, 1625, he went with the king and court to Canterbury, to await the arrival of Henrietta Maria, and while there on June 5 died of what appears to be apoplexy. His monument, with a bust, is in the north aisle of the nave at Canterbury, and a portrait is in the Music School at Oxford. His wife's name was Elizabeth Patton; and of their seven children six survived him, two of whom, Christopher and Orlando, were musicians.

Gibbons' reputation as an organist was great; he had the 'best hand in England.' His compositions are not numerous, but most of them are pure gold. The best known are his Morning and Evening Service in F; the anthems, "O Clap your Hands," and "God is Gone up" (eight-parts); "Hosanna," "Lift up your Heads" (six-parts); and "Almighty and Everlasting God" (four-parts); the five-part madrigals, "The Silver Swan," "O that the Learned Poets," and "Dainty, Fine, Sweet Bird." Besides these he left *Preces* and hymns, a score of anthems, both full and verse; seventeen madrigals, the remainder of the volume published in 1612; nine fantasies for strings (1611); six pieces for the virginals, included in "Parthenia" (1612) and a few other miscel-



laneous pieces. These show him to have been not only learned, as all musicians of that time were learned, but animated by grace, dignity and sentiment, such as was possessed by none of his predecessors in the school. Nothing more noble and spirited was ever written than his "Hosanna," nothing more touchingly religious and beautiful than his "Almighty and Everlasting," or "The Silver Swan." In these exquisite compositions the art disappears, and the sentiment of the words is immediately seized. His Service, for propriety, dignity, and beauty, remains above all that preceded or followed it. It and the anthems named above retain their constant place in English choirs.

With Gibbons the great church school of England came to an end. Byrd had died in 1623, two years before him, and Bull, Weelkes, Dowland, and others of the old giants departed just at this date. The great troubles followed very shortly and the death of the king and the destructions of the Civil War; music was all but extinguished, and the new school began on fresh foundations with the Restoration, in the persons of Pelham Humfrey, Blow, and Purcell. But Orlando Gibbons is the culmination of the ancient musical art of England, and as long as voices can sing and hearts can delight in real beauty he will remain at the head of the English church school of music. For the full list of his works and other details, see Grove's *Dictionary of Music and Musicians*.

GIBEON, a town famous in Old Testament history, known under the name of El Jib, situated five miles northwest of Jerusalem. It is now a small village standing on an isolated hill above a flat corn valley. The famous spring (2 Sam. ii. 13) comes out from under a cliff on the southeast side of the hill, and the water runs to a reservoir lower down.

GIBRALTAR (Spanish, *Gibraltar*), an isolated mass of rock in the southwest of Spain, rising to an altitude of 1,408 feet, three miles in length and three-fourths of a mile in average breadth, is situated at the extremity of a low sandy peninsula, which connects it on the north with Andalusia; its most southern headland, Point Europa, is in 36° 2' 30" N. lat., and 5° 15' 32" W. long. Its western side is washed by the Bay of Gibraltar, called also the Bay of Algeciras; and at the foot of the rock on this same side is the town of Gibraltar, which consists of two parts, the South Town, above the dockyard, and the North Town, which has narrow streets and many mean houses, and is inhabited by a motley agglomeration of English, Spaniards, Moors and Jews. Population (1890) 24,139, including the garrison of 5,000 to 6,000 men. Among the more important of the public institutions must be mentioned the numerous barracks; the governor's official residence, called the Convent—it formerly belonged to the Franciscans; the naval hospital; the Alameda Gardens, stretching between the North Town and the South Town; the signal station, crowning the central eminence of the rock, 1,255 feet high; the remains of the ancient Moorish castle, founded in the tenth century; and the lighthouse on Point Europa, erected in 1841, whose light, 150 feet above the sea, is seen for twenty miles. At the northern base of the rock is the open space called the North Front, extending as far as the British lines; here are the cemetery, the cricket-ground, the race-course, etc. Between the British and the Spanish lines is the Neutral Ground, which is uninhabited. On the west side of the rock, south of the Alameda Gardens, are the naval victualling-yard and the naval dockyard. This latter dates from the eighteenth century, and is protected on the south by a new mole, a quarter of a mile long. The merchant-vessels which visit the town find good anchorage in the Bay of Gibraltar, eight miles long by five

wide. Gibraltar has been a free port since its capture by the British. Until the introduction of steam vessels, especially for a score of years from 1808, it was one of the chief commercial emporia of the Mediterranean. Nevertheless the burden of the vessels entering and filling increased from 5,128,484 tons (of which 4,165,345 were British) in 1878 to 10,499,851 (8,541,370 British) in 1887. Gibraltar is an important coaling station. The governor exercises all the functions of a legislative and executive; but the local affairs of the town are managed by a body of sanitary commissioners. Since 1842 Gibraltar has been the see of an Anglican bishop with an extensive jurisdiction.

Almost the entire rock bristles with artillery. Every spot from which a gun can be brought to bear is occupied by cannon, which oftentimes quaintly creep out of the most secluded nooks, among geraniums and flowering plants, while huge piles of shot and shell, some of enormous size, are stowed away in convenient places, screened from an enemy's fire, but all ready for use. The approaches from the north across the flat isthmus connecting the rock with Spain, and from the sea, the south and southwest sides are guarded by a great number of very powerful batteries mounted with guns of the heaviest caliber, and by fortifications so strong in themselves and in their relative bearings on each other that the rock may fairly be regarded as impregnable so long as a sufficient garrison remains for its defense, and sufficient provision for the maintenance of the troops and any civil inhabitants suffered to reside there during hostilities. Moreover, a sea wall defended by a system of flanking bastions and strengthened by a breakwater constructed in 1846, extends along the western base of the rock from the new mole to the old. Toward the north and the northwest the defenses are aided by a series of fortified galleries, some two to three miles in length. These consist of an upper and lower tier; in the former are two large halls; one, St. George's, is fifty feet long by thirty-five wide. Port-holes are cut in these galleries for cannon at intervals of twelve yards. The eastern side is so precipitous as to be altogether secure from assault. The annual cost to the British government of maintaining the garrison and fortifications averages about \$1,650,000. In these days, however, of steamships and heavy long range guns the military importance of Gibraltar has certainly diminished.

The rock is composed of Jurassic limestone resting on a Silurian basement. The surface presents a bare and repellent aspect, principally due to the absence of trees; nevertheless there are grassy wooded glens in the nooks of the mountain. The rocky mass is perforated by numerous caverns, some of which penetrate for several hundred feet into the rock. The largest, called the "Hall of St. Michael," is 220 feet long, 90 feet wide, and 70 feet high, and its floor is connected with the roof by stalactite pillars ranging up to fifty feet in height, linked by arches on the top. The entrance lies about 1,100 feet above the level of the sea. Large stalactites are found in most of the other caverns and interesting fossils abound throughout the peninsula. Gibraltar is the only place in Europe where monkeys live wild, but in 1881 the colony had dwindled down to about twenty members.

Gibraltar has been known in history since the days of the early Phœnician navigators. The Greeks called it Calpe, and it and Abyla (now Ceuta) opposite formed the Pillars of Hercules, and were held to be the western boundary of the world. We have no certain information of its natural strength being made available for defensive or aggressive purposes until the year 711 A.D. when the Saracen leader, Tarik, a general of the Calif Al-Walid, crossing from Africa for the invasion of the



Visigothic kingdom, fortified it as a base of operations, and a ready point of access from the Barbary coast. From the chieftain it took the name of Gebel-el-Tarik, or hill of Tarik, of which Gibraltar is a corruption. One of the old towers of his early castle still remains. In 1302 Ferdinand II., of Castile, won it from the Moors, but in 1333 it fell to the army of the king of Fez, whom a siege by the Castilian monarch failed to dislodge. In 1410 Yussuf, king of Granada, possessed himself of the fortress, which, however, was finally wrested from the Moors by the Spaniards in 1462, and by them refortified and strengthened in every way. A combined Dutch and English force, however, under Sir George Rooke and Admiral Byng, and the Prince of Hesse-Darmstadt, after a vigorous bombardment and a landing in force, compelled the governor to capitulate in 1704.

Since 1704 Gibraltar has remained continuously in the possession of the British in spite of many desperate efforts on the part of Spain and France to dislodge them. Before the victors had been able to add to the defenses their mettle was severely tried by two attacks in 1704-5. The most memorable of the sieges to which Gibraltar has been exposed commenced June 21, 1797, when, Great Britain being engaged in the struggle with its revolted colonies and at the same time at war with France, Spain took the opportunity of joining the coalition and made a most determined attempt to subdue the garrison of this isolated fortress. It was, however, defended with heroic valor by General Elliott (afterward created Lord Heathfield) and 5,000 men, including 1,100 Hanoverians. Several times the defenders were on the point of starvation. On November 26, 1781, in a desperate midnight sally, the British succeeded in destroying the more advanced of the enemy's lines on the land side, in setting fire to many of his batteries, and in blowing up his principal depôt of ammunition. At length in July, 1782, the Spaniards were reinforced by the French, the Duc de Crillon took command of the assailants, and preparations were made for a grand assault. Additional batteries were constructed on the land side and floating batteries built to bombard the fortress from the sea. Covered boats, destined to disembark 40,000 troops, were at the same time prepared. The effective force with which General Elliott had to withstand these efforts comprised about 7,000 men. The attack commenced on September 8th by a furious bombardment simultaneously on all sides and it was kept up without intermission until the 14th, but by means of red hot balls and incendiary shells the otherwise invulnerable floating-batteries were all set on fire and destroyed and the attack was completely repulsed, with a loss to the garrison of only sixteen killed and sixty-eight wounded. Since then the fortress has enjoyed immunity from attack. See Brinkwater's *History of the Siege of Gibraltar* (1785); Gilbard's *History of Gibraltar* (1881); H. M. Field, *Gibraltar* (New York, 1889).

GIBRALTAR, STRAITS OF (anciently the *Straits of Hercules*), connect the Mediterranean with the Atlantic. They narrow toward the east, their width between Point Europa and Cape Ceuta being only fifteen miles, and at the western extremity twenty-four; the northwest part measures nine miles. The length (from east to west) is thirty-six miles. A constant surface current which runs in from the Atlantic is counterbalanced by an undercurrent from the Mediterranean.

GIBSON, EDMUND (1669-1748), bishop of London, the learned compiler of the *Codex Juris Ecclesiastici Anglicani*, was born at Bampton in Westmoreland.

GIBSON, JOHN, sculptor, was born near Conway, England, in 1790, in very humble circumstances, his father being a market gardener. He is a notable ex-

ample of one who, with no so-called start in life, carved his way to distinction by the force of a steady purpose and strong will. He was, after a few years of schooling, bound apprentice to a firm of cabinetmakers, with whom he learned the art of wood carving. Finally, his indentures were bought by a marble cutter, a Mr. Francis, who paid £70 for his unexpired time. Francis paid the lad 6s. a week, and received good prices for his works,—sundry early works by the youthful sculptor, which exist in Liverpool and the neighborhood, going by the name of Francis to this day. It was while thus apprenticed that Gibson attracted the notice of Mr. Roscoe, whose taste in Greek art seems to have been superior to his judgment in Italian history. For him Gibson executed a basso rilievo in terra cotta, now in the Liverpool Museum. Roscoe opened to the sculptor the treasures of his library at Allerton, by which he became acquainted with the designs of the great Italian masters. A cartoon of the Fall of the Angels marked this period,—now also in the Liverpool Museum. Roscoe was an excellent guide to the young aspirant, pointing to the Greeks as the only examples for a sculptor. Gibson here found his true vocation. A basso rilievo of Psyche carried by the Zephyrs was the result. He sent it to the Royal Academy, where Flaxman, recognizing its merits, gave it an excellent place. He went to Rome in October, 1817, at a comparatively late age for a first visit. In Rome he first became acquainted with rules and technicalities, in which the merest tyro was before him. Canova introduced him into the Academy supported by Austria, and, as is natural with a mind like Gibson's, the first sense of his deficiencies in common matters of practice was depressing to him. His subjects were gleaned from the free actions of the splendid Italian people noticed in his walks, and afterward baptized with such mythological names as best fitted them. Thus, a girl kissing a child, with a sudden wring of the figure, over the shoulder, became a Nymph and Cupid; a woman helping her child with his foot on her hand on to her lap, a Bacchante and Faun; his Amazon thrown from her Horse, one of his most original productions, was taken from an accident he witnessed to a female rider in a circus; and the Hunter holding in his Dog, was also the result of a street scene. The prominence he gave among his favorite subjects to the little god "of soft tribulations" was no less owing to his facilities for observing the all but naked Italian children, in the hot summers he spent in Rome.

In monumental and portrait statues for public places, necessarily represented in postures of dignity and repose, Gibson was very happy. Great as he was in the round, Gibson's chief excellence lay in basso rilievo, and in this less disputed sphere he obtained his greatest triumphs. Gibson's power of drawing may be pronounced to have been unsurpassed by any modern. He had an iron hand, and used the pen in rapid action with as much certainty as if it had been the graver. Gibson was the first to introduce color on his statues,—first, as a mere border to the drapery of a portrait statue of the Queen, and by degrees extended to the entire flesh. Gibson's individuality was too strongly marked to be affected by any outward circumstances. In all worldly affairs and business of daily life he was simple and guileless in the extreme; but he was resolute in matters of principle, determined to walk straight at any cost of personal advantage. Unlike most artists, he was neither nervous nor irritable in temperament. It was said of him that he made the heathen mythology his religion; and indeed in serenity of nature, feeling for the beautiful, and a certain philosophy of mind, he may be accepted as a type of what a pure-minded Greek pagan, in the zenith of Greek art, may have been. Gibson was elected R.A. in 1836, and



bequeathed all his property and the contents of his studio to the Royal Academy, where his marbles and casts are open to the public. He died at Rome in January, 1866.

GICHTEL, JOHANN GEORG, founder of the mystic sect of Gichtelians or Angelic Brethren, was born at Ratisbon, March 14, 1638. He became an ardent student and disciple of Jacob Boehme, whose works he published in 1682; but before the time of his death, which occurred in 1710 he had attracted to himself a small band of followers known as Gichtelians or Angelic Brethren, who propagated certain views at which he had arrived independently of Boehme. Seeking ever to hear the authoritative voice of God within them, and endeavoring to attain to a life altogether free from carnal desires, like that of "the angels in heaven, who neither marry nor are given in marriage," they claimed to exercise a priesthood "after the order of Melchizedek," appeasing the wrath of God, and ransoming the souls of the lost by sufferings endured vicariously after the example of Christ. The sect, never a numerous one, is said still to subsist in some districts of Holland and North Germany.

GIDEON, liberator, reformer, and "judge" of Israel, was the youngest son of Joash, of the "house" of Abiezer, and tribe of Manasseh, and had his home at Ophrah, the site of which is probably to be sought westward of Jordan, somewhat to the south of the plain of Jezreel. Gideon lived at a time when Israel, grown idolatrous, had been brought very low by periodic incursions of the "Midianites" and "Amalekites," nomad tribes from the east of Jordan, who in great numbers were wont to overrun the country, destroying all that they could not carry away. In the beginning of the narrative of his public life he is represented as an unambitious man, quietly engaged in agricultural pursuits, who yet had already distinguished himself as a "mighty man of valor," probably in guerilla warfare against the common foe. According to that narrative, his first exploit worthy of special commemoration, was the destruction, by divine command, of the altar of Baal belonging to his father, and of the Ashera beside it, and the substitution of an altar to Jehovah. But immediately before this he had also been summoned by "the angel of the Lord" to undertake, in dependence on supernatural direction and help, the work of liberating his country from its long oppression, and, in token that he accepted the mission, had already erected in Ophrah an altar which he called "Jahveh-Shalom" (Jehovah is prosperity). The great gathering of the Midianites and their allies on the north side of the plain of Jezreel "stretching from the hill of Moreh;" the general muster first of Abiezer, then of all Manasseh, and lastly of the neighboring tribes of Asher, Zebulun, and Naphtali; the signs by which the wavering faith of Gideon was steadied; the methods by which an unwieldy mob was reduced to a small but trusty band of energetic and determined men; and the stratagem by which the vast army of Midian was surprised and routed by the handful of Israelites descending from "above Endor," are indicated with sufficient clearness in the Scripture narrative, and need not be detailed. There is some difficulty in following the account of the subsequent flight of the Midianites, which seems to have taken place in two directions—Oreb and Zeeb making for the lower fords of Jordan toward the southeast, while Zebah and Zalmunna took the upper passage, a little below the place where the river flows out of the Sea of Galilee. Leaving the Ephraimites (who had now risen in force) to deal with the former, Gideon with his 300 appears to have kept up the pursuit of the latter to Nobah and Jogbehah, points beyond Succoth and Penueel, where a bloody contest resulted in the destruction of that portion

of the Midianite army, and in the ultimate capture and execution of Zebah and Zalmunna. Almost simultaneously with these occurrences eastward of Jordan, messengers from Ephraim bearing the heads of Oreb ("raven") and Zeeb ("wolf"), who with their followers had been crushed at "the raven's rock" and "the wolf's den" respectively, announced the completeness of Israel's victory. Having taken unrelenting vengeance on the men of Penueel and Succoth, who had shown a timid neutrality when the patriotic struggle was at its crisis, Gideon returned to his native Ophrah, where he further distinguished himself by his pious magnanimity in refusing the kingship which had been put within his reach—an act of self-denial, however, which, according to the sacred historian, was somewhat neutralized by his subsequent folly in establishing a shrine which proved a snare to all Israel, not excluding his family or even himself. For forty years after the great victory he lived at his own house in Ophrah in considerable wealth and magnificence, yet always in a private station—there being no direct scriptural evidence at least that his judgeship lasted during all that period, or that it ever gave him any position of legally recognized authority.

GIEN, a town of France, at the head of an arrondissement in the department of Loiret, is situated on the right bank of the Loire, thirty-nine miles east-southeast of Orleans.

GIESEBRECHT, WILHELM VON, historian, born March 5, 1814, in Berlin, became professor of history at Königsberg in 1857, and in 1862 at Munich. His chief works are *Geschichte der Deutschen Kaiserzeit* (5 vols., 1855–80); *Jahrbücher des Deutschen Reichs* (1840); a translation of Gregory of Tours (1851); *Deutsche Reden* (1871); *Arnold von Brescia* (1873).

GIESELER, JOHANN KARL LUDWIG, one of the most distinguished of the modern school of scientific writers on church history, was born at Petershagen, near Minden, on March 3, 1792. In his tenth year he entered the orphanage at Halle, whence he duly passed to the university, his studies being interrupted, however, from October, 1813, till the peace of 1815, by a period of military service, during which he was enrolled as a volunteer in a regiment of chasseurs. Having in 1817 taken his degree in philosophy, he in the same year became assistant head master in the Minden gymnasium, and in 1818 was appointed conrector of the gymnasium at Cleves. The first part of the first volume of his well-known *Church History* appeared in 1824. In 1833 he accepted a call to Göttingen, where the remainder of his life was spent, marked by few noteworthy events beyond the steady publication of volume after volume of his contributions to historical science. In 1837 he was appointed a consistorialrath, and shortly afterward was created a knight of the Guelphic order. In the winter of 1853–4 symptoms of failing health began to appear, and toward the end of the session he was able to lecture only occasionally. His death occurred on July 8, 1854.

GIESSEN, a town of Germany, capital of the province of Upper Hesse, in the grand-duchy of Hesse-Darmstadt, is situated in a beautiful and fruitful valley at the confluence of the Wieseck with the Lahn. The university, founded in 1607 by the landgrave Louis V., has a large and valuable library, a botanic garden, an observatory, an anatomical theater, an infirmary, a maternity hospital, a museum of natural history, and a chemical laboratory which was directed by Professor Liebig.

GILFEN, ROBERT, statistician and writer on trade and finance, was born at Strathaven, in Lanarkshire, Scotland, in 1837. He entered journalistic life in Scotland in 1860, and two years later removed to London,



where he was connected with the *Globe* (until 1866), the *Fortnightly Review*, the *Examiner* (1868–76) and the *Daily News* (1873–76). In 1876 he was appointed chief of the statistical department of the Board of Trade, but resigned his connection with this in 1881. He was president of the Statistical Society from 1882 to 1884, and published *Stock Exchange Securities* (1878); *Essays in Finance* (first series, 1879; fourth edition, 1886; second series, 1886), and numerous official reports and papers.

GIFFORD, ADAM, founder of the Scottish lectureships in natural theology, was born in Edinburgh in 1820, studied at the university there, and was called to the Scotch bar in 1849. He became sheriff of Orkney in 1865, was raised to the bench as Lord Gifford in January, 1870, and died at Granton, near Edinburgh, on January 20, 1887. By his will he left \$125,000 to the University of Edinburgh, \$100,000 each to Glasgow and Aberdeen, and \$75,000 to St. Andrews, to endow lectureships in natural theology, subject to no dogmatic tests whatsoever. The first lecturers appointed were Max Müller, E. B. Tylor, Andrew Lang, and J. Hutchinson Stirling.

GIFFORD, WILLIAM, man of letters, was born at Ashburton, Devonshire, England, in April, 1757. Left an orphan at twelve, he was first a cabin boy, then for four years a shoemaker's apprentice, till in 1776 his attempts at versifying attracted the notice of a local surgeon. With his assistance he proceeded, two years later, as a bible clerk to Exeter College, Oxford, and after graduating in 1792 travelled on the continent with Lord Grosvenor's son. His first production, the *Baviad* (1794), was a satire on the Della Cruscans; in Scott's phrase, it "squabashed" them at one blow. The *Mevaid* (1796) was levelled against the corrupters of the drama, and *An Epistle to Peter Pindar*, against Dr. Wolcot, who retorted with *A Cut at a Cobbler*. Gifford's editorship of the *Anti-Jacobin* (1797–98), procuring him favor with the Tory magnates, he was appointed to offices that jointly brought him \$4,500 a year. In 1802 appeared his translation of Juvenal, and, prefixed thereto, an autobiography. He edited the works of Massinger, Ford, Shirley, and Ben Jonson, and in his notes assailed former editors with brutal ferocity. In 1809 he became the first editor of the *Quarterly Review*, and this post he filled to within two years of his death, on December 31, 1826. Gifford possessed much satirical acerbity and poison, but as a poet he holds no rank whatever. As translator and editor of the old English dramatists he did good service; but his labors in this field were marred by suspicion and malignity. As a critic he was bitterly partial and one-sided, and his onslaughts on Hazlitt, Leigh Hunt, Lamb, Wordsworth, Shelley, and Keats, have as little pretensions to fairness and candor as has Hazlitt's own onslaught on him in the *Spirit of the Age* (1825).

GIFT, in law, means a gratuitous transfer of property. Any person is at liberty to do what he pleases with his own property and can give it away with or without consideration if he is so inclined. When he gives away goods or chattels, mere delivery of possession accompanied with words of gift is sufficient to transfer the property; and then the transaction is irrevocable. But if he does not give possession of the goods at the same time, then, that the gift may be binding upon him, he must execute a deed or writing under seal. The reason of this is that a mere verbal promise, without some legal consideration, is nugatory and revocable, whereas when a person executes a deed he is estopped from ever afterward denying it. Where the property given is not personal, but real, then a deed is in general necessary to transfer the property. A will is the most

familiar example of a gift of property, both real and personal, for the testator generally in such a case gives away his property gratuitously. A gift of personalty by will is called a legacy or bequest, and a gift of land is called a devise.

GIGA, or GIGUE, the name of a short piece of music much in vogue in olden times, of a joyful or lively character, and in 6-8 or 12-8 time, sometimes in 3-8; used formerly as a dance tune and often introduced as a movement of a larger composition. *Fig* is a form of the same word. The Irish jig is a dance tune in 6-8 time.

GIJON, a town and seaport of Spain, in the province of Oviedo or Asturias, on the coast of the Cantabrian Sea. The population of Gijon in 1860 was 24,802. During the summer there is a considerable influx of strangers.

Gijon is usually identified with Gigia of the Romans, which, however, occupied the site, not of the present town, but of the adjoining suburb of Cima da Villa.

GILA, a river of North America, rising in New Mexico, and flowing nearly 680 miles westward across Arizona, until it joins the Colorado about seventy-five miles above the fall of that river into the Gulf of California.

GILA MONSTER is a name commonly given to the poisonous lizard *Heloderma suspectum*, also called the Sonoran Heloderm. It is one of the largest lizards of North America, and is found in the sandy deserts of New Mexico, Arizona and Texas. Its scales are brilliant orange and jet-black. Its poisonous qualities it shares with its congener, the *Heloderma horridum* of Mexico, which, like snakes, has grooved teeth and highly developed salivary glands at their bases. Its bite is rapidly fatal to small animals and birds, and very injurious, though seldom fatal, to man. The heloderms are the only lizards ascertained to be venomous.

GILBART, JOHN WILLIAM, the author of a number of works on banking, was descended from a Cornish family, and was born in London, March 21, 1794. He died in 1863.

GILBERT, SIR HUMPHREY, a celebrated English navigator, was born in 1539, in the county of Devon, second of the three sons of Otho Gilbert, of Greenway. By his mother's side he was half-brother to Sir Walter Raleigh, who resembled him in many points of character, and whose early life was largely influenced and guided by his example. Educated first at Eton and then at Oxford, he was destined by his father for the law; but being introduced at court by Raleigh's aunt, Catherine Ashley, he obtained the special favor of the queen, and was thus enabled to follow his natural inclination for active enterprise. Recommended by royal letter to Sir Philip Sidney, he received from him an appointment in the army in Ireland; and his services contributed so powerfully to put down the rebellion raging there that, in 1570, he was made a knight and rewarded with the government of Munster. He next served for about five years in the Netherlands, being the first English colonel intrusted with command of English forces in that country. On his return to his native land he wrote a remarkable treatise on a subject at that time before the minds of men, the possibility of a northwest passage to India; and, in 1576, it was published without his knowledge by George Gascoigne as *Discourse of a Discoverie for a new Passage to Cataia*. The theory in question was supported with no small force of argument, and the discourse was probably not without its influence in leading Frobisher to set out on his first voyage to the frozen north. In June, 1578, Gilbert received letters patent authorizing himself, his heirs and assigns, to discover, occupy and possess such remote "heathen lands not actually possessed of any Christian prince or



people, as should seem good to him or them." Disposing not only of his patrimony, but also of the estates in Kent, which he had, through his wife, daughter of John Aucher, of Ollerden, he strenuously prepared to put his permission to use, and his brother Raleigh joined him in the enterprise. By the end of the summer of 1578 a fleet of eleven sail, with four hundred marines and men-at-arms, was collected off the coast of Devon; but the gallant projectors were singularly unfortunate in the character of some of their associates. Dissensions broke out among the captains and disorder among the crews. It was not till November 19th that Gilbert set sail, with his forces reduced to seven ships and one hundred and fifty men. The history of the voyage is involved in obscurity, but about the beginning of summer or a little earlier, in 1579, the fleet returned to England, with little, it would appear, to report except that it had lost one of its chief ships and one of its bravest captains, Miles Morgan, in an encounter with the Spaniards. Gilbert lent his three ships to the government for service against the Spaniards on the Irish coast; but on July 11, 1582, we still find him complaining to Walsingham that he had not received the moneys that were due to him, and that thus he was prevented from doing more for his queen and country. He was already planning a new expedition; and at length, in 1583, his fleet was got together. On June 11th he departed from Plymouth with five sail; but, on the 13th, the *Ark Raleigh*, which had been built and manned at his brother's expense, "ran from him in fair and clear weather, having a large wind." This desertion was a cause of no small displeasure to the admiral, and he wrote to Sir George Peckham to solicit his brother to make the crew an example to all knaves; but it appears not improbable (according to Hayes in Hakluyt's collection) that the reason of their conduct was the breaking out of a contagious sickness in the ship. On August 5th Gilbert landed in Newfoundland, and took formal possession of it in the queen's name; but proceeding southward with three vessels, he lost the largest near Cape Breton, and was at last constrained to return homeward with the *Golden Hind* and the *Squirrel* as the only remnant of his fleet. "On Monday, September 9th," reports Hayes, the captain of the *Hind*, "the frigate was near cast away, yet at that time recovered; and giving forth signs of joy, the general, sitting abaft with a book in his hand, cried out unto us in the *Hind*, 'We are as near to heaven by sea as by land.' The same Monday night the frigate's lights were suddenly out, and it was devoured and swallowed up by the sea." So perished Sir Humphrey Gilbert.

GILBERT, NICOLAS JOSEPH LAURENT, a French poet, was born at Fontenay-le-Château, in Lorraine, in 1751, and died in 1780.

GILBERT, or GILBERD, WILLIAM (c. 1540-1603), was the most distinguished man of science in England during the reign of Queen Elizabeth.

GILBERT DE LA PORRÉE (*Gilbertus Porretanus* or *Pictaviensis*), an eminent scholastic logician and theologian of the twelfth century, was born at Poitiers, and died in 1154.

GILBERT OF SEMPRINGHAM, ST., founder of the order of Gilbertines, was born about the year 1083 at Sempringham, Lincolnshire, where his father, Jocelyn de Sempringham, a Norman noble who had taken part in the Conquest, had settled. On the completion of a liberal education, received partly in England and partly in France, Gilbert was ordained a priest in 1123, having been presented by his father to the united livings of Sempringham and Tirington. About 1135 he established in the immediate vicinity of his parish church a religious house for the reception of some destitute girls; the rule

he prescribed was substantially that of St. Benedict, but the restrictions laid upon the communication of the inmates with the outer world were unusually severe. Subsequently the laborers who tilled the lands with which this establishment had been endowed were also formed into a religious community, under a rule resembling that of the Austin Friars, their house being placed close beside that of the nuns. Similar institutions elsewhere were encouraged by various English proprietors, and placed under the superintendence of Gilbert, who at last made application to Pope Eugenius III. to have them all merged in the Cistercian order (1148). This request, however, was refused, and Gilbert continued to act as superior of the monasteries he had founded for many years; although at the time of his death, on February 3, 1189, that dignity was held by Roger, one of his disciples. In 1189 the Gilbertines are said to have possessed thirteen monasteries, with almshouses, hospitals, and orphanages attached; and the community numbered in all upward of 700 male and 1,100 female members. At the time of their suppression the total number of Gilbertine houses in England and Wales had increased to about twenty-five. Gilbert, who had sided and suffered with the church in the quarrels between Henry II. and Thomas à Becket, was canonized by Innocent III. in 1202; and his name is commemorated in the martyrologies on February 4th.

GILBERT ISLANDS. See POLYNESIA.

GILBOA, a bare chain of hills between 500 and 600 feet high, overhanging the site of the ancient city of Jezreel, and rising between the fertile plains of Esdraelon on the west and the green valley of the Jordan on the east. It is memorable as the scene of the defeat and death of King Saul and his three sons at the hands of the Philistines.

GILCHRIST, ALEXANDER, Blake's biographer, was born at Newington Green, England, in 1828, the son of a Unitarian minister, who, conscientiously withdrawing from the office of the ministry, removed when Alexander was a year old, to a mill near Reading. At the age of twelve Gilchrist entered University College, London, where for four years he was a diligent scholar, and formed a friendship with the Rossettis. Leaving school at sixteen he entered the Middle Temple in 1846, and was called to the bar in 1849, but never practiced. Maintaining himself chiefly by art criticism, he married in 1851. After collecting, in Yorkshire, materials for a *Life of Etty*, he settled at Guilford in 1853. The *Life of Etty*, warmly commended by Carlyle, appeared in 1855. The following year he removed to Chelsea, taking a house next door to the Carlyles. Here was composed his *Life of Blake*, a labor of love, engaging all of his faculties. Before the task was yet completed the author was cut off by scarlet fever on November 30, 1861. His wife, Anne Gilchrist, *nee* Burrows, was born in London in 1828. In 1851 she married; in 1855 began to write for *All the Year Round*; in 1861 for *Macmillan's Magazine*. On her husband's death she undertook the completion of his *Life of Blake* (1863), to the second edition of which (1880) is appended a Memoir of Alexander Gilchrist. In 1869 she published in the *American Radical Review*, "A Woman's Estimate of Walt Whitman," and it was largely to become personally acquainted with the poet that she spent three years in America (1876-79); when she wrote for *Blackwood's* "Glimpses of a New England Village." In 1883 appeared her *Life of Mary Lamb*. She died in 1885.

GILDAS, or GILDUS, the earliest of British historians, surnamed by some Sapiens, and by others Badonicus, seems to have been born in the year 516. Regarding him little certain is known, beyond some isolated particulars that may be gathered from hints dropped in



the course of his work. His materials, he tells us, were collected from foreign rather than native sources, the latter of which had been put beyond his reach by circumstances. The *Cambrian Annals* give 570 as the year of his death.

**GILDING.** There are many processes of gilding, varying with the nature of the substance to be gilded and the kind of effect required to be produced, but they may all be classified under three heads, viz.: (1) mechanical gilding, (2) chemical gilding, and (3) encaustic gilding. The first is used chiefly for gilding wood, plaster of Paris, leather, paper and other substances. If the object to be gilded is a picture or mirror frame consisting of a plain wooden molding, then after getting a coat of oil paint, from four to ten coats of whiting mixed with fine glue are put on, each in its turn being smoothed with pumice stone and fine sandpaper. This done, a coat of gold size is given to those parts not to be burnished; but those which are receive only a coating of clear animal size. Both of these prepared surfaces now receive the gold-leaf, which is laid on by means of a broad thin brush called a tip, and further pressed with a thick soft-haired brush. Those parts which have been gold-sized are in this way oil-gilded, and will stand washing; while such portions as have been gilded on the size preparation, in order to be burnished, will not bear soap and water. If the picture frame is much enriched with fine raised ornament the surface to be gilded is previously prepared with oil-paint and gold-size alone, as the coating with whiting destroys the sharpness of the work. The result, however, is more tender and less durable.

*Japanner's Gilding.*—Where ornaments are to be put on a japanned ground they are by one method painted with gold size and gold leaf afterward applied. By another method rather more than the space that the ornament is to occupy is wholly covered with gold leaf, adhering with isinglass. The ornament is then painted on with asphaltum, which protects the gold beneath it while the superfluous leaf is being washed away. A little turpentine will then remove the protecting asphaltum so as to display the gilt ornament. Japanners' gold-size is a mixture of linseed-oil, gum-animi, and vermilion.

*False Gilding*, although an old invention, has become in recent years an important trade in Germany. The molding intended to be gilded in this way is first covered with bright silver-leaf or tin foil on a surface prepared as above and then coated with a yellow varnish. Other substitutes for genuine gilding that are largely used consist in applying "Dutch gold," which is copper beaten out like gold leaf, as in genuine gilding, or in using so-called "gold-paint," which is finely powdered brass or other similar alloy.

*Chemical Gilding.*—Metals are now usually gilded by the process of electro-gilding; but, besides this, various methods of chemical gilding have been adopted and some are still in use.

*Water, or Wash Gilding*, as it is somewhat inappropriately termed, consists in applying to metal a paste formed of an amalgam of gold, and afterward evaporating the volatile mercury by heat, which leaves the gold firmly adhering to the surface of the metal.

*Gilding by Immersion.*—For this purpose a solution of gold in nitro-muriatic acid is used which slowly attacks the metal to be gilded, and at the same time deposits on its surface an equivalent of gold. The method called *Grecian gilding* is another similar process, in which gold is used dissolved in a solution of sal-ammoniac and corrosive sublimate in nitric acid.

Most articles that are gilded by either of the above chemical methods, or by electro-gilding, are submitted to an after-process of coloring. This consists either in acting upon the surface with a saline solution, and heat-

ing the article afterward, or in coating it with a kind of varnish of beeswax and yellow ochre, and then burning this off. The coloring of jewelry, etc., made of gold alloyed with copper or brass, is performed by submitting the article to the action of a mixture of nitre, alum, and common salt, either dry or dissolved in water, heat being applied in either case. The baser alloy is thus removed from the surface, which becomes covered with a richly colored film of nearly pure gold.

Sword-blades, lancets, and other steel articles are gilded in fancy devices by drawing the design with a camel hair pencil moistened in a solution of gold, prepared by agitating ether with a solution of terchloride of gold, and decanting the light liquid which floats on the top. Silks, artificial flowers, ivory, bone, etc., may be gilded by immersing them in, or painting them with a neutral solution of one part of terchloride of gold to four or five of water, and then exposing them in a vessel containing hydrogen gas, which readily combines with the chlorine and reduces the gold to a metallic state.

*Encaustic Gilding* is usually applied to glass or porcelain. The gold is first obtained in a finely divided state by precipitating from the chloride with protosulphate of iron, or by simply heating the chloride. This powder is ground up with one-twelfth of its weight of oxide of bismuth and some borax and gum water and then painted on the ware. It is then heated until the borax is vitrified and thereby fixed. Sometimes the gold is ground with turpentine, or an amalgam of gold is used. This has a brown, dingy appearance when it leaves the kiln; the gold lustre is brought up by burnishing.

*Gilding Metal.*—The metal of which gilded goods are made is required to have as nearly as possible the color of gold, so that when the surface gilding is worn off at the more exposed parts the difference in color will not be readily apparent. This is obtained by making a kind of brass, having a much larger proportion of copper than common brass. The following are three receipts from among a variety in use: (1) six parts copper, one common brass; (2) four parts copper to one Bristol brass; (3) thirteen parts copper, three parts brass, twelve parts tin. The last is much harder than number one or two.

**GILEAD** (גִּלְעָד, *i. e.*, "hard" or "rugged") is sometimes used, both in earlier and in later writers, to denote the whole of the territory occupied by the Israelites eastward of Jordan, extending from the Arnon to the southern base of Hermon. More precisely, however, it was the usual name of that mountainous district which is bounded on the north by the Hieromax (Yarmuk), on the east by the Jordan, on the south by the Arnon, and on the west by a line which may be said to follow the meridian of Ammân (Philadelphia, or Rabbath-Ammon).

**GILES**, ST. (ÆGIDIUS, EGIDIO, GIL, or GILLES), according to the *Breviarium Romanum* (September 1st), was an Athenian of royal descent, and from his earliest years distinguished for piety and charity. On the death of his parents he, while still young, distributed among the poor his entire patrimony, including his very tunic, which garment effected a miraculous cure upon the poor sick man to whom it had been given. Shrinking from the publicity involved in this and many other (apparently involuntary) miracles, he betook himself to Provence, where, after a residence of two years with St. Cæsarius at Arles, he withdrew into the solitude of the neighboring desert, living upon herbs and the milk of a hind which came to his call at stated hours. Here he was discovered after some time by the



king of France, who on a hunting expedition had tracked the hind to the hermit's cave. With the reluctant consent of Ægidius, a monastery was now built on the spot, he being appointed its first abbot. The functions of this office he discharged with prudence and piety until his death, which occurred some years afterward.

Some uncertainty attaches to the date, as well as to several other circumstances stated in this narrative.

GILFILLAN, GEORGE, a clergyman of the United Presbyterian Church of Scotland, and a well-known popular writer, was born January 30, 1813, at Comrie, Perthshire, where his father, the Rev. Samuel Gilfillan, also a man of some literary activity, was for many years minister of a secession congregation. He died in 1878. The most extensive publication with which Gilfillan was connected was Nichol's edition of the *British Poets*; and his office was not only to secure the utmost accuracy in the text of each poet's works, but also to furnish both a biography and a critical estimate.

GILGAL. Three towns of this name are mentioned in the Bible. (1) The first and most important was situated "in the east border of Jericho," on the border between Judah and Benjamin. Josephus places it fifty stadia from Jordan and ten from Jericho; but these measurements do not agree with the position of Jericho with respect to Jordan. (2) The second Gilgal, mentioned in Joshua in connection with Dor, appears to have been situated in the maritime plain.

GILGIT (*Ghilghit*, etc.), properly a secluded valley-state on a tributary of the Upper Indus, but also applied to the tributary river and the whole of its basin, which is one of great interest in many respects, though as yet but imperfectly known.

GILL, JOHN (1697-1771), a Baptist minister and learned Rabbinical scholar, was born at Kettering, Northamptonshire, in 1697, and died in 1771.

GILLESPIE, GEORGE, a prominent figure among the Westminster Divines, was born at Kirkcaldy, Fifeshire, Scotland, where his father was parish minister, January 21, 1613. He pursued his studies at St. Andrew's and early in 1638, after the power of the bishops had been broken, was ordained minister of Wemyss, in Fifeshire. He showed characteristic fearlessness at the Glasgow Assembly that same year, was translated to Edinburgh in 1642, and the year after was sent up as one of Scotland's four representatives to the Westminster Assembly, where his vigor, ability, and earnestness enabled him to take a great part in the protracted debates on church discipline and dogma. His *Aaron's Rod Blossoming, or the Divine Ordinance of Church Government Vindicated* (1645), is admittedly a masterly statement of the high Presbyterian claim for full spiritual independence. In 1648 Gillespie was appointed moderator of the General Assembly, but his already enfeebled frame soon sank under its labors. He died at Kirkcaldy, December 17, 1648.

GILLESPIE, THOMAS, one of the founders of the Scottish "Presbytery of Relief," was born in the parish of Duddingston, Midlothian, in 1708, and died in 1774.

GILLIES, JOHN, the historian of ancient Greece, was born in 1747 at Brechin, in Forfarshire. He was educated at the university of Glasgow, where he greatly distinguished himself, and where, at the age of twenty, he officiated for a short time as substitute for the professor of Greek. In 1784 he completed his principal work, the *History of Ancient Greece, its Colonies and Conquests*, which he published two years later in two vols. 4to. This work gives a clear and generally accurate account of the various states of Greece, and the progress of each in literature and the arts. The learning it displays is considerable, but its reflections are generally

somewhat diffuse, and the style is abrupt and frequently diffuse. It enjoyed, however, for some time a great popularity, and was translated into French and German. It was long a favorite text-book for schools, but is now completely superseded. On the death of Robertson, Gillies was appointed historiographer-royal of Scotland. In his old age he retired to Clapham, where he died February 15, 1836, in the ninetieth year of his age.

GILLRAY, JAMES, one of the most eminent of caricaturists, was born at Chelsea in 1757. Gillray commenced life by learning letter-engraving, in which he soon became an adept. This employment, however, proving irksome, he wandered about for a time with a company of strolling players. After a very checkered experience he returned to London, and was admitted a student in the Royal Academy, supporting himself by engraving, and probably issuing a considerable number of caricatures under fictitious names.

The excesses of the French Revolution made Gilray conservative; and he issued caricature after caricature ridiculing the French and Napoleon, and glorifying John Bull. He is not, however, to be thought of as a keen political adherent of either the Whig or the Tory party; he dealt his blows pretty freely all round. Gillray died on June 1, 1815, and was buried in St. James' churchyard, Piccadilly.

GILLS, or BRANCHLAE, organs of aquatic respiration consisting of expansions through the thin skin by which oxygen dissolved in the water is taken into the blood while carbolic acid passes out. It is difficult to say what animal first exhibits gills, for respiration through the general skin is common in lower invertebrates, and the distinction between mere skin lobes and marked expansions in special connection with the vascular system is arbitrary. In star-fishes thin out-pushings of the lining of the body-cavity project through pores in the skin; a modification of this simple plan is seen in some other Echinodermata; while the characteristic tube-feet are sometimes respiratory, and the Holothurians have often respiratory tentacles. In marine worms we find every transition from vague skin respiration to the increase of this by filaments or tentacles associated with legs or head, and finally to definite gills. These are usually thin expansions, filamentous, tufted, or feathery, which project into the water, have cilia on their outer surface and blood vessels riddling them internally. In some of the lower Crustaceans again, (Branchiopoda—i.e. "gill-footed"), a number of the legs are thin enough to admit of respiration through their surfaces, while the higher forms have associated with some of their limbs special tufts of respiratory filaments, or definite feathery gills, as in the lobster. These consist of a main stem, within which are two canals, one for the impure blood from the body, the other for the return of oxygenated blood on its way to the heart; but with these canals are connected numerous hollow, thin-walled filaments, in which the real respiration is effected. In the lobster and its allies these are overlapped by the sides of the anterior shield, but water currents are kept up by the baling action of one of the anterior appendages on each side. In the King-crab (*Limulus*) rather an Arachnid than a Crustacean, five pairs of abdominal appendages bear flat "gill-books" each of which consists of an axis bearing some 150 hollow, thin-walled, blood-containing leaves. In the aquatic larvæ of some insects the air-tubes (trachæ) are closed, but form gill-like outgrowths (tracheal gills) by means of which oxygen is absorbed. In bivalve molluscs (Lamellibranchs) the gills usually form ciliated plates on each side of the body. Each gill, or ctenidium, as it is often called, really consists of two rows of hollow processes of the



body-wall, extending downward on each side of the foot, but each filament at its free end usually bends up again, so that a cross-section has the form of a W, the medium apex of which represents the point of origin from the body-wall. Neighboring filaments become linked to one another, and ascending and descending parts of the same filaments are likewise crossed by bridges, so that finally continuous plates result, channelled by blood-containing canals. Somewhat simpler, on the whole, are the external gill filaments of chiton, of the limpet, of undibranchs, etc., or the internal gills (covered by a folding of the mantle) in many aquatic Gasteropods; or, lastly, the well developed feather-like gills in the mantle cavity of cuttle-fishes.

Among vertebrates gills are developed only as far as the amphibians, all of which have them in their youth, though many, such as the frog, have them entirely replaced by lungs in adult life. Beyond amphibians gills never occur, though branchial or visceral clefts on the sides of the pharynx remain as traces of the ancestral condition. In tunicates and in the lancelet water entering by the mouth washes the blood spread out in vessels between the slits on the walls of the pharynx, but there are no gills. In the round mouths, or Cyclostomata, the gills are inclosed in pocket-like structures, through which the water passes. In fishes we have to distinguish transitory external gills occasionally present from true internal gill-filaments borne on the branchial arches, and washed as usual by the water, which, entering by the mouth, passes out by the gill-slits. The gill of a fish generally consists of two triangular folds of mucous membrane, supported by the branchial arch and minor cartilaginous rods, and traversed by vessels with impure blood from the heart, and with oxygenated blood to the body.

GILLYFLOWER, a popular name applied to various flowers, but principally to the clove, *Dianthus Caryophyllus*, of which the carnation is a cultivated variety, and to the stock, *Matthiola incana*, a well-known garden favorite. The word is sometimes written gilliflower or gilloflower, and is reputedly a corruption of July-flower, "so-called from the month they blow in."

GILPIN, BERNARD, a rector of Houghton-le Spring, distinguished by the unusual way in which he carried out his conception of the duties of a Christian pastor, was born at Kentmere, Eng., in 1517.

At Houghton his course of life was a ceaseless round of benevolent activity. His hospitable manner of living was the admiration of all. Strangers and travelers found a ready reception; and even their horses were treated with so much care that it was humorously said that, if one were turned loose in any part of the country, it would immediately make its way to the rector of Houghton. Every Sunday, from Michaelmas till Easter, was a public day with Gilpin. For the reception of his parishioners he had three tables well covered—one for gentlemen, the second for husbandmen, the third for day-laborers; and this piece of hospitality he never omitted, even when losses or scarcity made its continuance difficult. He built and endowed a grammar-school at a cost of upward of £500, educated and maintained a large number of poor children at his own charge, and provided the more promising pupils with means of studying at the universities. So many young people, indeed, flocked to his school that there was not accommodation for them in Houghton, and he had to fit up part of his house as a boarding establishment. Grieved at the ignorance and superstition which the remissness of the clergy permitted to flourish in the neighboring parishes, he used every year to visit the most neglected parts of Northumberland, Yorkshire, Cheshire, West

moreland and Cumberland; and that his own flock might not suffer, he was at the expense of a constant assistant. Among his parishioners he was looked up to as a judge, and did great service in preventing law-suits among them. If an industrious man suffered a loss, he delighted to make it good; if the harvest was bad, he was liberal in the remission of tithes. And all this he was enabled to do because his frugality was as great as his generosity; for his rectory was worth no more than £400 a year. The boldness which he could display at need is well illustrated by his action in regard to dueling. Finding one day a challenge-glove stuck up on the door of a church where he was to preach, he took it down with his own hand, and proceeded to the pulpit to inveigh against the unchristian custom. He died in 1583.

GILPIN, WILLIAM, author of several works on the scenery of Great Britain, was born at Carlisle in 1724, and died in 1804.

GILTHEAD, (*Chrysophrys*), a genus of "sea-brems" or *Sparidae* represented by about a score of species from the warmer seas, best known by the Mediterranean species (*Ch. aurata*), sometimes found on the southern coasts of England. Large species occur off the Cape of Good Hope, and *Ch. hasta* is common on East India and Chinese coasts. The gilthead has an oblong and compressed body, a single dorsal fin with spines which can be received into a groove, scaly cheeks and gill cover, and two kinds of teeth, sharp like canines in front, rounded like molars behind. The length is about a foot; the back is silvery gray, shaded with blue; the belly like polished steel; the sides have golden bands; and there is a half-moon shaped spot of gold between the eyes to which the various names of *Chrysophrys* ("golden eyebrow"), *Aurata* ("gilded"), *Daurade*, and *Gilthead* obviously refer. They feed chiefly on molluscs, in search of which they are said to stir up the sand with their tails. The fish is generally found near the shore in small shoals and its presence is sometimes betrayed to fishermen by the noise which its teeth make in crushing shells. It was often kept in the *vivaria* by the Romans, being much valued and easily fattened.

GIL VICENTE. See VICENTE, GIL.

GIMBALS (Lat. *gemellus*, "a twin"), are two circular brass hoops used for suspending the compass-box on board ship, so that it may always rest horizontally, unaffected by the ship's motion. The outer hoop is attached to a box or other fixed object, while the inner is constructed so as to allow of its moving freely within the outer, to which it is attached by two pivots at the extremities of a diameter. The compass-box is attached to the inner hoop by two smaller pivots at right angles to the former. Thus the compass moves freely in two directions at right angles to each other, and can always retain its horizontal position, however the vessel may roll or pitch. Gimbals are also applied to other instruments.

GIMP, or GYMP, a kind of trimming for dresses, curtains, furniture, etc., made either of silk, wool or cotton. Its peculiarity is that fine wire is twisted into the thin cord of which it is made. Gold and silver are used into the manufacture of military gimps.

GIN, the name commonly given to an aromatized spirit for drinking, varieties of which are also known as Geneva, Hollands and Schiedam. Gin is an abbreviation of Geneva, both being primarily derived from the French *genièvre* (juniper), from the fact that the characteristic flavoring ingredient of the spirit is juniper berries. Gin was originally and is still largely a Dutch compounded liquor, but it has long been a favorite stimulant beverage with the lower orders in London and other large English towns; and it is manufactured on a great scale by English rectifiers. As each separate dis-



tiller varies to some extent the materials and proportions of ingredients used in the preparation of gin, the varieties of the beverage are numerous; but generally a clear distinction exists between Hollands or Dutch gin and English gin. In the manufacture of Hollands a mash is prepared consisting of say 112 pounds of malted bere or bigg and 228 pounds of rye meal, with 460 gallons of water, at 162° Fahr. After infusion a proportion of cold water is added; and when the heat is reduced to about 80°, the whole, about 500 gallons, is run into the fermenting vat, to which about half a gallon of yeast is added. Fermentation speedily ensues, and in about two days the attenuation is complete, although at this stage nearly one-third of the saccharine matter in the liquor is undecomposed. The special features of the fermentation are the small proportion of yeast employed and the imperfect attenuation of the worts. The wash so obtained is distilled, and the resulting low wine is redistilled, with the addition of juniper berries and a little salt, sometimes with the addition of hops. Dutch gins vary much one from another, but generally they are much purer and mellower liquors than the more highly flavored and frequently adulterated British gins.

GINCKELL, GODART VAN, first earl of Athlone, general, was born in Guelderland about 1630 or 1640, and died in 1703. In 1690 Ginckell accompanied William III. to Ireland, and commanded a body of Dutch cavalry at the battle of the Boyne. On the king's return to England General Ginckell was intrusted with the conduct of the war. He took the field in the spring of 1691, and established his headquarters at Mullingar. Among those who held a command under him was the marquis of Ruvigny, the recognized chief of the Huguenot refugees. Early in June Ginckell took the fortress of Ballymore, capturing the whole garrison of 1,000 men. The English lost only eight men. After reconstructing the fortifications of Ballymore, the army marched to Athlone, then one of the most important of the fortified towns of Ireland. The Irish defenders of the place were commanded by a distinguished French general, Saint-Ruth. The firing began on June 19th, and on the 30th the town was stormed, the Irish army retreating toward Galway, and taking up their position at Aghrim. Having strengthened the fortifications of Athlone and left a garrison there, Ginckell led the English, on July 12th, to Aghrim. An immediate attack was resolved on, and, after a severe and at one time doubtful contest, the crisis was precipitated by the fall of Saint-Ruth, and the disorganized Irish were defeated and fled. A horrible slaughter of the Irish followed the struggle, and 4,000 corpses were left unburied on the field, besides a multitude of others lay along the line of the retreat. Galway next capitulated, its garrison being permitted to retire to Limerick. There the viceroy, Tyrconnel, was in command of a large force, but his sudden death early in August left the command in the hands of General Sarsfield and the Frenchman D'Usson. The English army came in sight of the town on the day of Tyrconnel's death, and the bombardment was immediately begun. Ginckell, by a bold device, crossed the Shannon and captured the camp of the Irish cavalry. A few days later he stormed the fort on Thomond Bridge, and after difficult negotiations a capitulation was signed, the terms of which were divided into a civil and a military treaty. Thus was completed the conquest or pacification of Ireland, and the services of the Dutch general were amply recognized and rewarded. He received the formal thanks of the House of Commons, and was created by the king first earl of Athlone and baron of Aghrim. The immense forfeited estates of the earl of Limerick were given to him, but the grant was a few

years later revoked by the English parliament. The earl continued to serve the English army, and accompanied the king to the Continent in 1693. He fought at Landen, and assisted in destroying the French magazine at Givet. In 1702 he took command of the Dutch serving under the duke of Marlborough. He died at Utrecht, February 10, 1705. On the death of the ninth earl without issue in 1844, the title became extinct.

GINGER, the rhizome or underground stem of *Zingiber officinale*, Roscoe, a perennial reed-like plant growing from three to four feet high. The flowers and leaves are borne on separate stems, those of the former being shorter than those of the latter, and averaging from six to twelve inches. The flowers themselves are borne at the apex of the stems in dense ovate, oblong, cone-like spikes from two to three inches long, composed of obtuse strongly-imbricated bracts with membranous margins, each bract inclosing a single small sessile flower. The leaves are alternate, bright green, smooth, tapering at both ends, with very short petioles. The plant, though unknown in a wild state, is considered with very good reason to be a native of the warmer parts of Asia, over which it has been cultivated from an early period, and the rhizome imported into England. From Asia the plant has spread into the West Indies, South America, western tropical Africa, and Australia.

The use of ginger as a spice has been known from very early times; it was supposed by the Greeks and Romans to be a product of southern Arabia, and was received by them by way of the Red Sea; in India it has also been known from a very remote period, the Greek and Latin names being derived from the Sanskrit. Marco Polo seems to have seen the ginger plant both in India and China between 1280 and 1290. John of Montecorvino, a missionary friar who visited India about 1292, gives a description of the plant, and refers to the fact of the root being dug up and transported. The spice is said to have been introduced into America by Francisco de Mendoza, who took it from the East Indies to New Spain. It seems to have been shipped for commercial purposes from San Domingo as early as 1585, and from Barbados in 1654; so early as 1547 considerable quantities were sent from the West Indies to Spain.

Ginger is known in commerce in two distinct forms, termed respectively coated and uncoated ginger, as having or wanting the epidermis. For the first, the pieces, which are called "races" or "hands," from their irregular palmate form, are washed and simply dried in the sun. In this form ginger presents a brown, more or less irregularly wrinkled or striated surface, and when broken shows a dark brownish fracture, hard, and sometimes horny and resinous. To produce uncoated ginger the rhizomes are washed, scraped, and sun-dried, and are often subjected to a system of bleaching, either from the fumes of burning sulphur or by immersion for a short time in a solution of chlorinated lime. The whitewashed appearance that much of the ginger has, as seen in the shops, is due to the fact of its being washed in whiting and water, or even coated with sulphate of lime. This artificial coating is supposed by some to give the ginger a better appearance; it often, however, covers an inferior quality, and can readily be detected by the ease with which it rubs off, or by its leaving a white, powdery substance at the bottom of the jar in which it is contained. Uncoated ginger, as seen in trade, varies from single joints an inch or less in length to flattish, irregularly branched pieces of several joints, the "races" or "hands," and from three to four inches long; each branch has a depression at its summit showing the former attachment of a leafy stem. The color, when not whitewashed, is a pale buff; it is



somewhat rough or fibrous, breaking with a short mealy fracture, and presenting on the surfaces of the broken parts numerous short bristly fibers.

The principal constituents of ginger are starch, volatile oil (to which the characteristic odor of the spice is due), and resin (to which is attributed its pungency). Its chief use is as a condiment or spice, but as an aromatic and stomachic medicine it is also used internally. "The stimulant, aromatic, and carminative properties render it of much value in atonic dyspepsia, especially if accompanied with much flatulence, and as an adjunct to purgative medicine to correct griping." Externally applied as a rubefacient, it has been found to relieve headache and toothache. The rhizomes, collected in a young, green state, washed, scraped, and preserved in syrup, form a delicious preserve, which is largely exported from the West Indies and from China. Cut up into pieces like lozenges, and preserved in sugar, ginger also forms a very agreeable sweetmeat.

GINGHAM is a woven cotton fabric, of a close, stoutish texture, the distinguishing characteristics of which are that it is a plain (*i. e.*, untwilled) cloth, woven into yarn-dyed stripes or checks of two or more colors. In some cases as many as seven or eight colors are introduced in the warp and weft of a gingham; but no patterns are made that cannot be woven in a common plain loom. Gingham was originally an Indian product, but its manufacture was early introduced into the Lancashire and Glasgow districts; and during the first half of the present century the trade formed an important feature in the textile industries of the latter locality — the demand for the fabric coming chiefly from the United States and the West Indies. The trade distinction of gingham is now to a large extent superseded by other terms.

GINGKO (*Gingko biloba*, or *Salisburia adiantifolia*) is the Japanese name of a coniferous tree of the yew alliance (Taxace), with very characteristic leaves, in form and variation recalling the leaflets of the maiden hair ferns. The yellow drupe-like seeds reach the size of a walnut, and are largely eaten throughout China and Japan; the chestnut-like kernels are roasted like chestnuts, and also yield a wholesome oil. The Japanese esteemed the trees as sacred, and planted it round their temples. Being a free-grower, and having been introduced in the eighteenth century, large trees are now not uncommon in Europe, nor in America, where they were introduced in 1784. The tree is dioecious, but the Chinese sometimes plant several male and female trees close together, so that male and female flowers appear to arise on the same tree.

GINGUENÉ, PIERRE LOUIS, the author of the *Histoire littéraire d'Italie*, was born April 25, 1748, at Rennes in Brittany. He was nominated one of the commission charged to continue the literary history of France, which had been brought down by the Benedictines to about the close of the twelfth century; and the three volumes of this series which appeared in 1814, 1817, and 1820 are, for the most part, the result of his labors. But the work by which Ginguené will be longest remembered is his *Histoire littéraire d'Italie* (nine vols. 8vo, 1811–1819), to which he was putting the finishing touches when he was cut off by a painful disease, November 16, 1815.

GINSENG, the root of a species of *Panax*, belonging to the natural order *Araliaceæ*, is a very celebrated Chinese medicine. The demand is so great that many other roots are substituted for it, notably that of *Panax quinquefolium*, Linn., distinguished as American ginseng, and imported from the United States. At one time the ginseng obtained from Manchuria was considered to be the finest quality, and in consequence be-

came so scarce that an imperial edict was issued prohibiting its collection. That prepared in Corea is now the most esteemed variety. The root of the wild plant is preferred to that of cultivated ginseng, and the older the plant the better is the quality of the root considered.

Ginseng of good quality generally occurs in hard, rather brittle, translucent pieces, about the size of the little finger, and varying in length from two to four inches.

GIOBERTI, VINCENZO, the ablest philosophical writer of modern Italy, and one of the most interesting actors in the recent history of the country, was born in Turin on April 5, 1801, the only child of parents in modern circumstances there, and was educated by the fathers of the Oratory with a view to the priesthood, to which he was ordained in 1825. The freedom of Italy from foreign masters became his ruling motive in life, and this freedom in his conception of it was an emancipation, not only from armed masters, but from modes of thought alien to its genius, and detrimental to its European authority. His popularity and private influence were reasons enough for the court party to mark him for exile; he was not of them, and could not be depended on. Knowing this, he in 1833 asked permission to resign his chaplaincy, to which he was appointed in 1831 by King Charles Albert, but was suddenly arrested while walking with a friend in the public gardens, and, after an imprisonment of four months, sent out of the country in the escort of a carabineer, under decree of banishment. With broken fortunes and ruined plans Gioberti arrived in Paris in the beginning of October, 1833. A year later he went to Brussels, where he spent the best period of his life from that time to 1845, teaching philosophy, and assisting in the work of a college. His spirits never returned to him, however, as his whole being was bound up with the welfare of his native country. An amnesty having been passed by Charles Albert in 1846, Gioberti had liberty to return to Italy, just as Pius IX. in the beginning of his pontificate manifested strongly liberal sympathies. Gioberti took no step, however, till the end of 1847, and did not return to his native land till after certain negotiations, and the public expression of popular enthusiasm in his favor. On his entrance into Turin, April 29, 1848, there was a general outburst of this enthusiasm, mainly caused, it appears, by his unjust banishment and by the large circulation of his books, especially the *Gesuita Moderno*. The king made him senator, but, having been returned both by Turin and by Genoa as deputy to the assembly of representatives, now first meeting under the new constitution, he elected to sit in the lower chamber, for his native town. Previous to the opening he made a tour in various provinces. While he was engaged in this tour, constantly addressing the people publicly, the chamber met and elected him president. In the same parliament sat Azeglio, Cavour, and other liberals, and Balbo was prime minister. At the close of the same eventful year, a new ministry was formed, headed by Gioberti; but with the accession of Victor Emmanuel in March, 1849, his active life came to an end. He died suddenly, of apoplexy, on October 26, 1852.

GIOJA, MELCHIOR, a distinguished Italian writer on philosophy and political economy, was born at Piacenza in 1767, and died in 1828.

GIORDANO, LUCA, a painter of great immediate celebrity, was born in Naples, son of a very indifferent painter, Antonio, who imparted to him the first rudiments of drawing. Nature predestined him for the art, and at the age of eight he painted a cherub into one of his father's pictures, a feat which was at once noised



abroad, and which induced the viceroy of Naples to recommend the child to Spagnoletto. His father afterward took him to Rome, to study under Pietro da Cortona. He acquired the nickname of Luca Fa-presto (Luke Work-fast). His rapidity, which belonged as much to invention as to mere handiwork, and his versatility, which enabled him to imitate other painters deceptively, earned for him two other epithets, "The Thunderbolt (Fulmine), and "The Proteus," of Painting. Charles II. of Spain toward 1687 invited him over to Madrid, where he remained thirteen years. Giordano was very popular at the Spanish court, being a sprightly talker along with his other marvelously facile gifts, and the king created him a cavaliere. One anecdote of his rapidity of work is that the queen of Spain having one day made some inquiry about his wife, he at once showed Her Majesty what the lady was like by painting her portrait into the picture on which he was engaged. After the death of Charles in 1700 Giordano, gorged with wealth, returned to Naples. He spent large sums in acts of munificence, and was particularly liberal to his poorer brethren of the art. He again visited various parts of Italy, and died in Naples on January 12, 1705.

GIORGIONE, the name adopted both by his contemporaries and by posterity for one of the most renowned of Italian painters, signifies George the Big, or Great, and was given him, according to Vasari, "because of the gifts of his person and the greatness of his mind." He was born in or shortly before the year 1477. In histories and catalogues he is now commonly styled Giorgio Barbarella of Castelfranco. His active career cannot have extended over more than fifteen years, since we know that he died in 1511, — according to one account, of a contagious disorder; according to another, of grief at discovering that his mistress had played false with a pupil. But in that brief career he had both deeply modified the older manner of the Venetian school, as represented even by a master so great and so austere as John Bellini, and had prepared the way for its final manner, as represented by the most complete master of all, Titian. Bellini, who outlived Giorgione, had not been ashamed to learn something from the practice of a teacher fully forty years younger than himself, who was probably in the first instance his own pupil. Titian, only ten years younger than Giorgione, succeeded to his conquests, and enjoyed the length of days which was denied him.

GIOTTINO, an early Florentine painter. Vasari is the principal authority in regard to this artist: but it is not by any means easy to bring the details of his narrative into harmony with such facts as can be verified at the present day. It would appear that there was a painter of the name of Tommaso (or Maso) di Stefano, termed Giotto; and the Giotto of Vasari is said to have been born in 1324, and to have died early, of consumption, in 1357 — dates which must be regarded as open to considerable doubt. It is even said that Giotto was really the son (others say the great-grandson) of Giotto. To Maso di Stefano, or Giotto, Vasari and Ghiberti attribute the frescoes in the chapel of S. Silvestro (or of the Berdi family) in the Florentine church of S. Croce. These works are animated and firm in drawing, with naturalism carried further than by Giotto. From the evidence of style, some modern connoisseurs assign to the same hand the paintings in the funeral vault of the Strozzi family, below the Cappella degli Spagnuoli in the church of S. Maria Novella, representing the crucifixion and other subjects. Vasari ascribes also to his Giotto the frescoes of the life of St. Nicholas in the lower church of Assisi. This series, however, is not really in that part of the church which

Vasari designates, but is in the Chapel of the Sacrament; and the works in that chapel are understood to be by Giotto di Stefano, who worked in the second half of the fourteenth century — very excellent productions of their period. It might, hence, be inferred that two different men produced the works which are unitedly fathered upon the half-legendary "Giotto," the consumptive youth, solitary and melancholic, but passionately devoted to his art. A large number of other works have been attributed to the same hand.

GIOTTO, relatively to his age one of the greatest and most complete of artists, fills in the history of Italian painting a place analogous to that which seems to have been filled in the history of Greek painting by Polygnotus. That is to say, he lived at a time when the resources of his art were still in their infancy, but considering the limits of those resources, his achievements were the highest possible. At the close of the Middle Age, he laid the foundations upon which all the progress of the Renaissance was afterward securely based. In the days of Giotto, the knowledge possessed by painters of the human frame and its structure rested only upon general observation, and not upon any minute, prolonged, or scientific study; while to facts other than those of humanity their observation had never been closely directed. Of linear perspective they possessed few ideas, and those elementary and empirical, and scarcely any ideas at all of aerial perspective or the conduct of light and shade. As far as painting could ever be carried under these conditions, so far it was carried by Giotto. He is one of the least one-sided of artists, and his art, it has been justly said, resumes and concentrates all the attainments of his time not less truly than all the attainments of the crowning age of Italian art are resumed and concentrated in Raphael. In some particulars the painting of Giotto was never surpassed, — in the judicious division of the field and massing and scattering of groups, — in the union of dignity in the types with appropriateness in the occupations of the personages — in strength and directness of intellectual grasp and dramatic motive, — in the combination of perfect gravity with perfect frankness in conception, and of a noble severity in design with a great charm of harmony and purity in color. His is one of the few names in history which, having become great while its bearer lived, has sustained no loss of greatness through subsequent generations.

Giotto di Bondone (a name, as it happens, also borne in the same generation by a distinguished citizen of Siena) was the son of a poor peasant of Vespignano. He was born in 1276, and drew, we are told, by natural instinct with whatever materials he could lay his hands on. He was ten years old when Cimabue, as the story goes, found him by the wayside, drawing a sheep with a piece of charcoal upon a stone or tile. The master, then at the height of his fame, took the peasant boy, with the glad consent of his father, to Florence to be his pupil. Of his early career after this we know no more until we find him at work as the foremost among many scholars employed under Cimabue at the interior decorations of the great memorial church of St. Francis at Assisi. Some interval (but the chronology of Giotto's career is at all points obscure) would seem to have elapsed between the execution of these frescoes and of others, better known than these, which adorn the lower story of the same structure. In four lunette-shaped spaces in the vaulting of this lower church, Giotto has painted four vast compositions, of which the scheme was dictated to him, no doubt, by some pious and learned mouthpiece of the wishes of the order. One of these exhibits the mystical wedding of Francis with Poverty; a second is an allegory of Chastity; a third



of Obedience; a fourth shows the saint glorified in heaven among the angels. To describe and explain these famous compositions would be beyond our scope. The ideas they embody cannot but seem strained and cold when we express them in modern language. Strained and cold, indeed, the ideas would have been in any other age of the world; but we must remember that the religious temperament of that age in Italy gave even to pedantry the colors of passion, and an ardent and solemn reality to the most far-drawn fantasies of devotion. And however cool the private judgment of Giotto in such matters may have been, it is not his private judgment which speaks to us from the painted allegories of Assisi; it is the sincere imagination of the men among whom he lived; it is the ardor and solemnity of the devotional spirit of his race. In one of the transepts of the same lower church there are frescoes of the Passion of Christ, and others of the life of St. Francis, which modern authorities hold against ancient, most likely with justice, to be also from the hand of Giotto.

Assuming that the later work of the master at Assisi belongs to the year 1296, or thereabout, we have good evidence that two years afterward he was working at Rome for the Cardinal Stefaneschi, nephew of Pope Boniface VIII. The remains of his industry in this employment may be seen in a mosaic of the *Navicella*, or Christ saving St. Peter from the waves, now preserved in the portico of St. Peter's at Rome, and in three panels, kept in the sacristy of the canons of the same church, which originally formed part of a ciborium. It is also recorded that Giotto adorned certain MSS. with miniatures for this patron; and in truth there exists in public libraries a very rare class of MSS., in which the miniatures bear the marks, if scarcely of the hand, at any rate of the immediate influence of Giotto. Lastly, a discolored fragment of a fresco of the church of St. John Lateran, shows the figure of Pope Boniface VIII. announcing from a balcony the opening of the famous jubilee of the year 1300. Soon after this, Giotto was once more in his native city. Recent research has again thrown in doubt the relative shares of the master and of his pupils in the decorations of the chapel, called by Ghiberti the chapel of the Magdalene, in the Bargello or palace of the Podestà at Florence. These were painted to celebrate the pacification between the black and white parties in the state, effected by the Cardinal d'Acquasparta as delegate of the Pope in 1302, and consisted of a series of Scripture scenes, besides great compositions of hell and paradise. It is in the paradise that the painter has introduced those groups, typical of pacified Florence, in which occur the portraits of Dante, Brunetto Latini, and Corso Donato, and which, amid the emotion of all who care for art or history, were recovered in 1841 from the whitewash that had overlain them.

The whole central period of Giotto's life, from about 1305 to about 1334, is divided between periods of residence at Florence and expeditions, of which we can in very rare instances trace the date or sequence, undertaken in consequence of commissions received from other cities of the peninsula. He was as much or more of a traveler as was Van Eyck a century later; and his travels exercised as much or more of the same fertilizing and stimulating influence on art in Italy as did those of the great Fleming in the northwest of Europe. The familiar story of the O belongs to a journey to France, which was projected by Giotto but never undertaken. Pope Benedict XI., the successor of Boniface VIII., sent a messenger to bring him proofs of the painter's powers. Giotto would give the messenger no other sample of his talent than an O drawn with a free sweep of the brush

from the elbow; but the pope was satisfied, and engaged Giotto at a great salary to go and adorn with frescoes the papal residence at Avignon. Benedict, however, dying at this time (1305), nothing came of this commission; and the Italian fourteenth century frescoes, of which remains are still to be seen at Avignon, have been proved to be the work, not, as was long supposed, of Giotto, but of the Sienese master, Simone Martini, called Simone Memmi. Another certain date in Giotto's career belongs to the close of the period we have defined. In 1328 he had painted in the palace of Signoria at Florence a portrait (now lost) of Charles of Calabria kneeling before the Virgin. Two years later he was invited by the father of this prince, King Robert of Naples, to come and work for him in that city. Some frescoes in the chapel of the Incoronata had been long erroneously supposed, on the authority of Petrarch, to represent a part at any rate of the industry of Giotto during the three years which he spent at Naples. It is the merit of Messrs. Crowe and Cavalcaselle, while conclusively setting aside this tradition, to have called attention to a real and very noble work of the master existing in a hall which formerly belonged to the convent of Sta. Chiari in that city. This is a fresco celebrating the charity of the Franciscan order under the figure of the miracle of the loaves and fishes, with the personages of St. Francis and St. Clare kneeling on either hand.

Between these two dates (1305 and 1330), Giotto is said to have resided and left great works at Padua, Ferrara, Urbino, Ravenna, Rimini, Faenza, Lucca, and other cities; and in several of these paintings are still shown which bear his name with more or less of plausibility. But among them it is at Padua only that his authentic and mature powers can really be studied, and that in perhaps the greatest and most complete series of creations of all that he has left. These are the frescoes with which he decorated the chapel built in honor of the Virgin or the Annunciation by a rich citizen of the town, Enrico Scrovegni, and called sometimes the chapel of the Arena, because it is on the site of an ancient amphitheater. Since it is recorded that Dante was Giotto's guest at Padua, and since we know that it was in 1306 that he came from Bologna to that city, we may conclude that to the same year, 1306, belongs the beginning of Giotto's great undertaking in the Arena chapel. The scheme includes a Saviour in Glory over the altar, a Last Judgment over the entrance door, and on either side a series of subjects from the Old and New Testaments and the apocryphal Life of Christ, painted in three tiers, and lowest of all, a fourth tier with emblematic Virtues and Vices in monochrome, the Virtues being on the side of the chapel which is next the incidents of redemption in the entrance fresco of the Last Judgment, the Vices on that side which is next the incidents of perdition. There is no other single building, or single series of representations, in which the highest powers of the Italian mind and hand at the beginning of the fourteenth century may be so well studied as here.

Meantime, Giotto had been advancing, not only in fame, but in years and in prosperity. He was married young, and had, so far as is recorded, three sons, Francesco, Niccola, and Donato, and three daughters, Bice, Caterina, and Lucia. He had added by successive purchases to the plot of land inherited from his father at Vespignano. His fellow-citizens of all occupations and degrees delighted to honor him. And now, in his fifty-eighth year, on his return from Naples by way of Gaëta, he received the final and official testimony to the esteem in which he was held at Florence. By a solemn decree of the Priori (April 12, 1334), he was appointed master of the works of the cathedral of Sta. Reparata (subsequently and better known as Sta. Maria del Fiore), and



architect of the city walls and of the towns within her territory. Dying in 1336, he only enjoyed these dignities for two years. But in the course of these two years he had found time not only to make an excursion to Milan, on the invitation of Azzo Visconti and with the sanction of his own Government, but to plan and in part to superintend the execution of two monuments of architecture, of which the one remaining is among the most exquisite in design and richest in decoration that were ever conceived by man. These were, the west front of the cathedral, and its detached campanile or bell tower. The cathedral front was barbarously stripped of its enrichments in a later age, and stood naked until the other day, when the city of Florence undertook to restore it in a modern imitation. The campanile remains, except for inconsiderable repairs, as it was left by the pupils of Giotto after their master's death; and in the consummate dignity as well as consummate delicacy of its design, in its fair proportions and in the opulent but lucid invention and apportionment of its details, in the thoughtfulness and pregnant simplicity of its sculptured histories, it is the most fitting crown and monument of a strong and memorable career.

GIOVINAZZO, a town of Italy, in the province of Bari, about eleven miles from Bari, on the railway from Otranto to Bologna.

GIOVIO, PAUL. See JOVIUS.

GIPSIES, a wandering folk scattered through every European land, over the greater part of Asia and North America, and along the northern coast of Africa. No general estimate can be formed of their numbers outside Europe, but travelers agree that they are very numerous in Persia, Armenia, Asiatic Turkey and Egypt, while in America, besides a multitude of British Gipsies, Gipsies from Spain, France, Germany and Hungary are not unfrequent. The total, 700,000, at which Miklosich placed (1878) the European Gipsies, fairly agrees with the following fragmentary statistics. Turkey, before its dismemberment, contained 104,750 (9,537 in Bosnia and the Herzegovina in 1874); Servia had 24,691 in 1874, Montenegro, 500 in 1873; and in Roumania there are from 200,000 to 300,000, according to the varying estimates of Cretulesco (1876) and the *Annuaire général officiel de Roumanie* (1874). In 1876 Austria counted about 1,000 (13,500 in Bohemia in 1846?), and Hungary 159,000 (78,923 in Transylvania in 1850, and 36,842 in Hungary proper in 1864); while Spain is credited with 40,000, France with from 2,000 to 6,000 (700 in the Basque country), Germany and Italy together with 34,000 (?), and Scandinavia with 1,500. In Russia their number in 1834 was stated at 48,247, exclusive of Polish Gipsies; in 1844 at 1,427,539, and in 1877 at 11,654.

Just as in every European land the Gipsy calls "Gentiles" (*i. e.*, non-Gipsies) *gajé*, he calls himself *Rom*, "a man or husband." This word *Rom*, connected by Paspatis with the name of the Indian god *Rāma*, is, by Miklosich, identified with the Sanskrit *doma* or *domba*, "a low-caste musician." Of names conferred by "Gentiles," some point to the fancied cradle of the Gipsy race. Thus *Gipsy* or *Gypsy* itself (*Egyptian* in the sixteenth century), the Spanish *Gitano*, Albanian *Ĵevk*, modern Greek *Γύφτος* (*Gyphos*), Magyar *Pharao népek* ("Pharaoh's people"), and Turkish *Fārāwni*, preserve the belief in its Egyptian origin, a belief which finds no confirmation except in the casual resemblance between *Rom* and the Egyptian *rôme*, "man," and which was possibly due to the Gipsies' skill in serpent-charming. The Scandinavian and Low-German *Tatare* identifies Gipsies with the Mongolian hordes, the terror of Europe in the thirteenth century; and their French name, *Bohémiens*, was probably due either to a confusion of some such form as *Secani* with *Czech*, or to the belief that

Gipsies originated in Bohemia. Other names again denote the character, hue or callings of the race, as Arabic *Harāmī*, "villain;" Dutch *Heydens*, "heathens," Persian *Karāchī*, "swarthy." Their Scotch name *Tinkler*, which occurs in a charter of William the Lion (1165–1214), is commonly held to be a mere variant of *tinker*; but if its initial *t* corresponds to *z* (*cf.* English *ten*, German *zehn*), it comes very near the Italian *Zingaro* or *Zingano*, which, like the German *Zigeuner*, Czech *Cin-gán* or *Cigán*, and Magyar *Cigány*, is a form of the most widespread of all the Gipsies' appellations—Bulgarian *Atzigan*, modern Greek *Ἀτσίγανος* (*Atsigkanos*) or *Ἀθίγγανος* (*Athigganos*).

*First Appearance in European History.*—From whatever cause, it is certain that a confusion did exist between the *Ἀτσίγανοι* and *Ἀθίγγανοι*, which renders it extremely difficult to determine whether the Byzantine historians are speaking of Gipsies or heretics in seven passages collected by Miklosich. It appears from these that *Ἀθίγγανοι*, described as magicians, soothsayers, and serpent-charmers, first emerge in Byzantine history under Nicephorus I. (802–11), were banished by Michael I. (811–13), and were restored to favor by Michael II. (820–29); but Miklosich's reasons for absolutely identifying them with Gipsies, and positively asserting the latter to have appeared at Byzantium in 810 under Nicephorus, are hard to recognize. Less dubious seems an extract from the Georgian *Life of Giorgi Mtharsmindel* (eleventh century), which describes how at Constantinople certain descendants of the race of Simon Magnus, *Atsinkan* by name, sorcerers and famous rogues, slew wild beasts by their magic arts in the presence of Bagrat IV. Such passages are open to some doubt; hardly so the following from the *Itinerarium Symonis Simeonis* (ed. by J. Nasmyth, Camb. 1778), where Fitz Simeon, a Franciscan friar of Dublin, describing his stay in Crete in 1322, says: "We there saw a people living outside the city (of Candia), who worship according to the Greek rite, and declare themselves of the race of Ham. They rarely or never stop in one place more than thirty days, but, as though accursed of heaven, wander from field to field with little, oblong, black, low tents, like those of the Arabs, or from cave to cave." The empress Catherine de Valois, again, who died in 1346, granted to the suzerains of Corfu authority to reduce to vassalage certain *homines vageniti* coming from the mainland, who under the Venetians formed in 1386 the nucleus of a *feudum Acinganorum* that lasted down to the present century. About 1378 the Venetian governor of Nauplion confirmed the *Acingani* of that Greek colony in privileges granted by his predecessors; and in 1387 Mircea I., waiwode of Wallachia, renewed a grant made by his uncle Ladislaus to the monastery of St. Anthony at Voditza of forty *salaschi* (tents) of *Acigani*. Other documents might be cited, but these are enough to show that in the fourteenth century Gipsies existed in the Balkan peninsula and islands of the Levant; that in Wallachia they were reduced to a state of bondage (from which they were only freed in 1856); and that nowhere were they regarded as newcomers, so that by these documents it is impossible to fix the date of the first Gipsy immigration. More than this, a metrical German paraphrase of Genesis, made by an Austrian monk about 1122, preserved at Vienna, and edited by Hoffmann in his *Fundgruben für Geschichte deutscher Sprache* (Breslau, 1837), goes far to prove that Gipsies were known in Austria three centuries before the commonly-accepted date of their appearance in that country. A passage relating to Hagar's descendants (Gen. xvi. 15) runs: "So she (Hagar) had this son; they named him Ishmael. It is from him the Ishmaelites descend. They journey



far through the world; we call them *chaltsmide* (lit. cold-smiths). \* \* \* They have no house nor country; everywhere they are found alike; they wander over the country, abusing people by their knaveries. Thus they deceive men,—robbing no one openly." That here by *chaltsmide*, *Ishmaelties*, and *descendants of Hagar* Gipsies are meant, scarcely admits of doubt, seeing that the smith's is still the Gipsies' leading handicraft; that Lusignan in 1573 speaks of the Gipsies of Cyprus as "Cinquanes, otherwise called *Agariens*;" and that in German and Danish *Rotwälsch* or thieves' slang *Geschmeilim* and *Smaelem* (i.e., *Ishmaelites*) signify "Gipsies." The *κωμοδρομοί* also of Byzantine writers were possibly Gipsies, being defined by Ducange as "circulatores atque adeo *Fabri ærarii* qui per pagos cursitant: ut hodie passim apud nos, quos *Chaudronniers* dicimus." Theophanes (758–818) speaks under the date 544 of a *κωμοδρομός* from Italy.

*Later Movements.*—Late in 1417 there came to Lüneburg a band of 300 wanderers, "black as Tartars and calling themselves *Secani*." At their head rode a "duke" and "count," splendidly dressed, and leading like nobles dogs of chase; next came a motley crew afoot; and women and children brought up the rear in wagons. They bore among other letters of safe-conduct one granted by the emperor Sigismund, and professed themselves engaged on a seven years' pilgrimage, imposed by their bishops in expiation of apostasy from the Christian faith. From Lüneburg they passed to Hamburg, Lübeck, Wismar, Rostock, Stralsund, and Greifswald, camping by night outside the walls, thieving by day, "wherefore several were taken and slain" (cf. the contemporary annals of Korner and Rufus, and Krantz's *Saxonia*, 1520). In 1418 they journeyed southward through Meissen, Leipsic, and Hesse, and, entering Switzerland, arrived at Zurich on August 31st, visiting also Basel, Bern, and Solothurn, according to Conrad Justinger (died 1426), who speaks of them as "more than 200 baptized heathens from Egypt." They now split up into two bands, the first of which appeared before Augsburg (November 1, 1418), the second before Sisteron in Provence (October 1, 1419), where the terrified citizens bestowed on the "Saracens" a hundred loaves. Next comes a long notice of a troop of fully one hundred lean, black, hideous Egyptians, in the *Chronica di Bologna* (July 18, 1422), which tells how the sorceress, "Duke" Andrew's wife, could read the past and future of men's lives; but Bologna, in fifteen days, became too hot for them, so, by way of Forli—where "certain said they were from India"—the pilgrims traveled on to Rome. Their object was to procure fresh letters from the pope; and such they afterward produced, though of their sojourn in the imperial city no record has yet been published. To the burghers of Ratisbon Gipsies presented themselves in 1424; they pitched their tents again before its walls in 1426; and at Paris, in 1427, the fair of Landit was attended by a duke, a count, and ten other mounted pilgrims, late renegades of "Lower Egypt," whose women practiced palmistry and cleared everybody's pockets. Later we hear of Gipsies at Arnheim (1429), at Metz (1430), at Erfurt (1432), and in Bavaria (1433)—these and all notices of the seventeen years preceding referring probably to the movements of a single ubiquitous band, sent forward to spy out the lands of promise, and composed of from 600 to 1,400 persons. For not until 1438 did the great tide of westward immigration begin to flow; then, not in hundreds but thousands, headed no longer by paltry "dukes" and "counts," but by a "king," King Zindl, the Gipsies poured over Germany, Italy and France, reaching Poland by 1501, Sweden by 1512, and, having already

appeared in Spain in 1447, we find them in England in 1514 (*A Dyaloge of Syr Thomas More*, 1529), but nothing is known of the date of their landing; and in Scotland the earliest certain record of their presence is an entry in the books of the Lord High Treasurer, "April 22, 1505. Item, to the Egyptianis, be the kingis command, vij. lib." (Pitcairn's *Criminal Trials*, Edinburgh, 1833, vol. iii., p. 592.) In a "King of Rowmais" (? *Rómas*, Gipsies), twice mentioned in entries of July, 1492, as also in the "Erle of Grece" (1502), "King Cristall" (1530), and the "King of Cipre" (1532), one dimly recognizes four Gipsy chiefs; and with Gipsies perhaps the Saracens may be identified, whom a tradition represents as making depredations in Scotland prior to 1,460 (Simson, p. 98). In no other country were Gipsies better received than in this, where they "dansit before the king in Halyrudhous" (1530); where James IV. gave (July 5, 1505) Anthonius Gagno, count of Little Egypt, a letter of commendation to the king of Denmark, and where James V. subscribed a writ (February 15, 1540) in favor of "oure louit. Johnne Faw, lord and erle of Littill Egipt," to whose son and successor he granted authority to hang and punish all "Egyptians" within the realm (May 26, 1540). But in 1541 an Act was passed, commanding the "Egyptians to pass forth of the realm" under pain of death, and similar edicts were issued before and afterward in most of the European states—Germany (1497), Spain (1499), France (1504), England (1531), Denmark (1536), Moravia (1538), Poland (1557), etc. Conveying across the sea was among the milder measures adopted; it is, however, noteworthy as one of the causes of the dispersion of the tribes. Under Henry VIII. gipsies were shipped from England to Norway (Wright's *History of Ludlow*, pp. 389–92) or France; while by the latter power, so lately as 1802, the bands infesting Bayonne and Mauleon were caught by night as in a net, huddled on shipboard, and landed on the coast of Africa (Michel, *Pays Basque*, p. 137). In Scotland four Faas were hanged at Edinburgh in 1611 "for abyding within the kingdome, they being Egyptianis;" and in 1636 doom was pronounced on other "Egyptians" at Haddington, the "men to be hangit, and the weomen to be drowned; and such of the weomen as hes children to be scourgit throw the burgh and brunt in the cheeke." Under the English statue of 1562 (repealed 1783) making it felony without benefit of clergy to be merely seen for a month in the fellowship of Gipsies, five men were hanged at Durham "for being Egyptians," August 8, 1592. Still greater were the cruelties and injustice suffered by the Gipsies on the Continent, since there, to the charge of kidnaping, were added the weightier imputations of being cannibals and emissaries of the Turk. Quiñones recounts how in 1629 four Estremaduran Gitanos owned under torture to have eaten a friar, a pilgrim, and a woman of their tribe; and in 1782 forty-five Hungarian Gipsies were beheaded, quartered, or hanged on a like monstrous charge. First racked till they confessed the crime of murder, they were brought to the spot where their victims were said to be buried, and when no bodies appeared, they were racked again. "We ate them," was their despairing cry; and forthwith the journals teemed with accounts of "eighty-five persons roasted by Gipsy cannibals;" straightway the "cannibals" were hurried to the scaffold. Then Joseph II. sent a commission down, whose inquiries showed that no one had been murdered—except the victims of the false accusation. The full, impartial annals of the race have still to be compiled, from edicts and law-books, from local histories and a few monographs like Dirk's *Geschied. kundige onderzoekingen aangaande het verblijf der Heidens of Egyptiërs in de Noordelijke Nederlanden*



(Utrecht, 1850), or Weber's *Zigeuner in Sachen*, 1488-1792, in volume ii. of his *Aus vier Jahrhunderten* (Leip. 1861).

*Language.*—Until lately the information about the Gipsy language to be gathered from books was meager in the extreme. The thirteen works published prior to 1840 which furnish specimens of the Anglo-Romani dialect, contain but three hundred and ninety-six genuine stems, besides sixty-nine doubtful words, and furnish scarcely any examples of the grammar. Nor are the Continental works cited by Pott, from Vulcanius (1589) downward, much more copious. Even to-day there are still great gaps in our knowledge, especially of the dialects outside of Europe; but enough has been done to show that from the Nile to the Arctic Ocean, from the Euphrates to the Atlantic, the Gipsies speak, with dialectal variations, one and the selfsame speech. The Romani names for "water," "fire," "hair," and "eye," are in Persia *pāni*, *aik*, *bāl* and *aki*; in Egypt *pāni*, *āg*, *bal*, and *ankhi*; in Norway *pani*, *jag*, *bal*, and *jak*; in England *pāni*, *yog*, *bal*, and *yok*. And these four instances, which might be multiplied indefinitely, serve further to show, by their resemblance to the Hindi *pānī*, *āg*, *bāl*, and *ānkh*, that in Romani we have an Indian tongue. Rüdiger first compared Romani, so long regarded as a thieves' jargon, with one of the New Indian dialects. In 1783 Grellman's *Historischer Versuch* reaped all the fruits of Rüdiger's research; and in the same year Marsden was independently led to a like discovery. The conclusion that the Gipsies wandered forth from India is now almost universally accepted, but when or from what part of India, are questions on which few have done more than idly speculate. Whether Romani is derived from Hindi, Marathi, etc., can only be determined by minute investigations, which, long neglected, are now being carried on by various Orientalists. They have at least established that Romani stands in the relation of a sister, not a daughter, to the seven principal New Indian dialects.

In Europe Miklosich distinguishes thirteen Romani dialects—the Greek or Turkish, Roumanian, Hungarian, Moravo-Bohemian, German, Polo-Lithuanian, Russian, Finnish, Scandinavian, Anglo-Scottish, Italian, Basque, and Spanish. To these should be added the Welsh, which, generally unintelligible to the English Gipsy, is one of the most perfect, as it has also been the least studied, of all the dialects. As a general rule, the further these dialects remove from Turkey, the more corrupt have they become, so that Gipsies of Spain, of Scandinavia, and in great measure of England, know no case or verb endings other than those of the lands of their adoption.

The Romani vocabulary reveals positively and negatively the route by which the Gipsies must have entered Europe, and the various ways by which they have since dispersed to their present quarters. The absence, for instance, of Arabic elements from every European dialect disproves a common belief that the earliest immigrants may have landed in the Balkan peninsula from Egypt. On the other hand, the presence of Persian and Armenian words shows that they must have traversed and halted in the lands where those languages are spoken.

The Gipsies have no literature worthy of the name—nothing but some rude ballads, some love and dance songs, and a considerable mass of folk-tales. Valuable from a linguistic point of view, the songs have little merit of their own, and seem to be mainly echoes of Gentile strains. The folk-tales, however, would possibly repay a keener investigation than they have yet received. Alike in Wales and Turkey they may be identified with those of other Aryan races; scarce one has

yet been published but its counterpart may be found in Grimm's, Ralston's or other collections of European folk-lore. This resemblance of Romani to Gentile stories may be explained (1) by the common origin of the Aryan races, (2) by the Gipsies having borrowed from the nations among whom they wander, or (3) by these nations having received their stories from the Gipsies. Probably all three explanations are true by turns, but the first is sometimes excluded by an identity of details too close to have been preserved through untold ages, and as to the second it is hard to see how a story current at Paderborn should have traveled eastward to Constantinople, especially as Paspatis's tales, enshrining words and phrases otherwise obsolete, are plainly of some antiquity. Accordingly the third explanation, that the Gipsies may have carried those stories westward with them, deserves consideration. Some of the Gaelic stories collected by Campbell were, it should be remarked, taken down from Tinklers; and from a London Gipsy he obtained a version of *The Master Thief*, which is current also among Roumanian Gipsies. At present our information is far too scanty to warrant a definite conclusion; but could it once be shown that the Asiatic possess the same stories as the European Gipsies, it might be necessary to admit that Europe owes a portion of its folk-lore to the Gipsies.

"The Gipsies," says Grellmann, "brought no particular religion with them, but regulate themselves in religious matters according to the country where they live, \* \* \* wherefore most writers place them below the heathens." This author notwithstanding, the Gipsies mix with their beginnings of Christianity or Mahometanism the relics of an older faith.

In Turkey, according to Paspatis, the nomad Tchinghianés far outnumber the sedentary; but how far the same statement is true of Gipsies of other lands is hard to determine. Certain at least it is that in England few house-dwelling Gipsies are to be met with who do not remember that their forefathers followed a wandering life, or who do not themselves go temporarily under canvas as hop-picking or the great race-meetings come round. But though for centuries the tent has been the Gipsy's normal habitation, it would not seem to have been so always, if we look to the evidence of the Gipsy tongue. For had it been, assuredly the Romani name for "tent" would be everywhere the same, whereas the Persian Gipsy calls it *guri*, the nomad Tchinghiané *katúna*, the sedentary *tchérga* (Turkish *cherkeh*), the Polish Gipsy *czater*, the German *tattin* (from *tatto*, "hot"), the English *tan*, etc. On the other hand, *ker*, "a house," occurs in every dialect. From the time, however, of Fitz-Simeon onward Gipsies have everywhere been found dwelling in tents, and his description of these tents as "like those of the Arabs, low, black, and oblong," tallies with Mr. Boswell's:—

"The tents are made of rough blankets. They are nearly always brown ones, because the white blankets are not so good for the rain. First of all they measure the ground with a ridge-pole, then they take the kettle-prop and make the holes exactly opposite each other. Then they take up the ridge-pole and stick all the rods into it. Then there is a blanket that goes behind, and is pinned on with pin-thorns; next to that come the larger ones over the top of all, also pinned with the same pins."

In the matter of dress, gipsies formerly had a distinctive costume, consisting of a turban-like headdress of many colors, together with a large cloak, worn after the fashion of a toga, over a long, loose under-skirt. The Gipsies, however, of to-day can hardly be said to have a distinctive garb, though certain minutiae of dress still render them easily recognizable. In Transylvania,



for instance, their women's ear-rings differ in pattern from those of the natives; the Hungarian Gipsy chief wears silver buttons, bearing a serpent-crest; and his old-fashioned English brother decks his Newmarket coat with spade-guineas or crown-pieces. The English Gipsy woman may be known by her bright silk handkerchief, her curiously-plaited hair, her massy rings, her coral or bead necklace, and by the *monging-guno*, a tablecloth arranged bagwise over her back. In August, 1878, Queen Victoria was welcomed to Dunbar by a Gipsy "queen," one of the Reynolds family, who was "dressed in a black robe with white silk trimmings, and over her shoulders wore a yellow handkerchief. Behind her stood two other women, one of them noticeable from her rich gown of purple velvet, and two stalwart men, conspicuous by their scarlet coats." On the other hand, the dress of the children upon the Continent is simple, not to say scanty.

Everywhere Gipsies ply an endless variety of trades. In Egypt they monopolize the art of serpent-charming; in France and Spain they sit as professional models; in England we meet Gipsy Methodist preachers, actors, quack doctors, chimney-sweeps, carpenters, factory hands, etc. But everywhere the men have three principal callings—workers in metals, musicians and horse-dealers; everywhere the women are "pleasaut dauncers" as in the days of Andrew Boorde, and by peddling and fortune-telling contribute their share—often more than their share—to the family purse. Gipsies have long been famous as copper and iron smiths in south-eastern Europe, where their horseshoes are reckoned unrivaled. Simson describes a primitive Tinkler method of smelting iron, and the caves of Granada still echo to the clink of Gipsy anvils; but in England the surname *petulengro*, "smith" (from *petul*, "horseshoe"), alone recalls the days when Gipsies surpassed the Gentile in the farrier's craft. Liszt ascribes to the Gipsies the creation of Hungary's national music. Bartalus (1868) contests the theory, but few would hesitate to admit its plausibility who at the Paris Exhibition (1878) or elsewhere have listened to the Gipsies' thrilling performance of a *czardas*, or are familiar with the undoubted compositions of Bihary, Csermak, and other Gipsy *maestri*. The Gipsy's favorite instrument is the violin, but few are the instruments he has not successfully essayed. The Eisteddfods of Wales have witnessed the triumphs of Gipsy harpists; and hundreds have been charmed by the concerts of the Roberts family, not knowing they were hearing a Gipsy band. "The Egyptians," as Krantzius dryly remarked in 1520, "frequently change their horses;" horse-dealing and horse-stealing are too often synonymous terms with them. Fortune-telling is on the wane with Gentiles' waning belief in the fortune-teller's powers. The Gipsy crone can no longer persuade the yeoman's wife to bury her treasure in the earth, and return in a fortnight's time to find it—gone. Those halcyon days of *maánzin* are passed by; the servant's hall is now the only El Dorado left. Enclosure Acts have struck a deadly blow at English Gipsydom, driving the wanderers from breezy common and turf-edged lane to the smoky suburbs of great town, or at best the outskirts of some watering place. Here, surrounded by Gentiles, the younger generation forget the wisdom of the Egyptians, relinquish time-honored customs, and, wedding with the sons and daughters of the land, widen the stream of Romani blood, and so diminish its "depth." Several accounts have been furnished of Romani marriages, but they rarely tally, and some (Bright's, Borrow's, and Simson's) do not bear quotation. On the Continent one common feature is the breaking by the chief of a flower-crowned pitcher, from whose fragments, as they are many or few, he

augurs the fortunes of the bridal pair. There are many curious Gipsy practices relating to death and burial, such as waking the corpse, burning the deceased's effects, the fasting of his kinsfolk, and a species of *tabu*. The earliest record of Gipsies burning the property of their dead occurs in the *Annual Register* for 1773: "The clothes of the late Diana Boswell, queen of the Gipsies, value £50, were burnt in the Mint, Southwark, by her principal courtiers, according to ancient custom." Much might be written of a kind of ceremonial purity prescribed by Gipsy law, and indicated in the language by the distinction between *chiklo*, "dirty," and *mokado*, "unclean." To wash a tablecloth with clothes is *mokado*, since it is connected with food; and a German Gipsy woman may not cook for four months after childbirth, while a vessel touched by the skirt of a woman's dress is held to be defiled. But with one other widespread practice we must take our leave of Gipsy customs, that, namely, of leaving at a cross-road a handful of grass or leaves, a heap of stones, a stick or some such mark to guide the stragglers of the band.

The Gipsy character, strange medley of evil and of good, presents itself as black and hateful to the outside world, whilst to the Romani race it is all that is fair and lovable. "There's nothing worse than mumply Gentiles" is a saying often in Gipsy mouths, which affords a clue to much that is puzzling in the Gipsy's nature. He is at war with mankind, for centuries his oppressors, and, all being fair in war, may plunder and beguile at will, so that he be not caught. Gipsies' light-heartedness and courtesy are patent to all men; but only to true or adopted members of the tribe are their inmost hearts revealed. Their principal faults are childish vanity, professional cunning, indolence (caused by the absence of ambition), and a hot passionate temper. But they are as ready to forgive as they are quick to resent a wrong; and before implicit confidence their cunning gives place to inviolate honor. Their family affection is intensely strong, prompting a parent never to chastise a younger child, a grown-up son meekly to take a thrashing from his father; and they are lavishly generous to such as are poorer than themselves, even though Gentiles. Their love of nature reveals itself in a hundred quaint, poetic phrases, in a familiarity with beasts and herbs; their love of dumb creatures in the number of their pets. Quick and versatile, all Gipsies readily adapt themselves to any state of life; they have so wonderful a gift of tongues that formerly it was reckoned against them for a proof of sorcery. That hitherto the race has produced, outside the realm of music, none but mute geniuses, is rather due to lack of education than of ability; but "Zingaro" seems to have only been a nickname of the Quentin Matsys of the South, Antonio Solario (1382-1455), and John Bunyan from parish registers does not appear to have had one drop of Gipsy blood.

Outwardly as within Gipsies present strong contrasts, some being strangely hideous, others very beautiful, though not with a regular, conventional beauty. Finely proportioned, they are as a race of middle stature, but lithe and sinewy, insensible to cold or wet, capable of supporting great fatigue. They pride themselves on their small hands and feet; corpulence rarely occurs, and only with the older women. The hair, black or dark brown, inclines to coarseness, is often frizzled, and does not soon turn gray; the complexion, a tawny olive, was compared by the Plymouth Pilgrims (1622) to that of the Indians of North America. The teeth are of dazzling whiteness and perfect regularity, the cheek bones high; and the aquiline nose is overhung by a strongly-marked brow, knit often in



deep lines of thought. But the most striking feature is the full, dark eye, now lusterless, then changing to an expression of mysterious, childlike sorrow, presently blazing forth with sudden passion. As is the case in other Oriental races, the Gipsies early develop and early fade.

**GIRAFFE** (*Camelopardalis giraffa*), a mammal belonging to the ruminant group of the Artiodactyle Ungulates, and the single living representative of the family *Camelopardalidæ*. Intermediate between the members of the deer and ox families, the giraffe differs from both in having neither true horns nor antlers. It possesses, however, two solid, bony, and persistent appendages, attached partly to the frontal and partly to the parietal bones; and not to the former only, as in the true horned ruminants, and these, unlike the processes of the latter, are distinct bones, separable, at least in the young animal, from those of the forehead. These horn-like peduncles are completely covered over by the skin of the forehead, and are terminated by a tuft of bristles, while in front of them there is a protuberance caused by a thickening of the bone, sufficiently prominent in the male to have been frequently described as a third horn. The giraffe is the tallest of existing animals, measuring usually from fifteen to sixteen feet high—the females being somewhat less—but attaining in the largest examples a height of eighteen feet. This exceptional elevation is chiefly due to its great length of neck and limb, the cervical vertebræ, although only seven in number, as in other mammals, being in this case exceedingly long. Its body is proportionately short, measuring only seven feet between the breast and rump, and slants rapidly toward the tail—a peculiarity which has given rise to the erroneous impression that the fore legs of the giraffe are longer than the pair behind. Its feet terminate in a divided hoof, which is as beautifully proportioned as that of the smallest gazelle; and the accessory hoofs found in most ruminants are entirely wanting. Its head is small, its eyes large and lustrous; and these, which give to the giraffe its peculiarly gentle appearance, are capable of a certain degree of lateral projection, which enables the creature, without turning its head, to see around, and, to a certain extent, behind it. The elevated eyes of the giraffe thus enjoy a wider range of vision than those of any other quadruped. Its nostrils are provided with a peculiar mechanism of sphincter muscles, by which they can be opened or closed at will, and the animal is thus enabled to avoid the injurious effects of the sand storms which occasionally pass over its native haunts. Its tongue is remarkable for its great length, measuring about seventeen inches in the dead animal, and for its great elasticity and power of muscular contraction while living. It is covered with numerous large *papillæ*, and forms, like the trunk of the elephant, an admirable organ for the examination and prehension of its food. The graceful appearance presented by the giraffe, to which it owes its name through the Arabian *Xirapha*, is greatly heightened by the orange-red color of its hide, mottled as it is all over with darker spots; while in its long tail, ending in a luxuriant tuft of dark-colored hair, it possesses an admirable fly-whipper, without which it would probably be impossible for the giraffe to maintain its ground against the seroot fly, and other stinging insects of Central Africa. It lives on open plains in the neighborhood of low woods, high forest being scrupulously avoided, as depriving it of the extensive prospect which forms its chief defense against the attacks of its two great enemies—the lion and man. It feeds almost exclusively on the foliage of trees, showing a preference for certain varieties of mimosa, and for the young shoots of the prickly acacia, for browsing on which the prehensile tongue and

large free lips of the giraffe are specially adapted. It is gregarious in its habits, living in small herds rarely of more than twenty individuals, although Sir S. Baker, who hunted it in Abyssinia, states that he has seen as many as a hundred thus herding together.

The giraffe is only found wild in Africa, where it ranges throughout the open country of Ethiopia as far south as the confines of Cape Colony. Until about fifty years ago it was almost totally unknown in Europe; it is now, however, to be found in most of the European zoölogical gardens, where it appears to thrive as well on corn and hay as on the mimosas of its native haunts. It also breeds freely in confinement, so that it may now be regarded as acclimatized in Europe.

The skin of the giraffe forms a valuable leather material, that made from the thicker parts being in special request for sandals; its flesh, according to Sir S. Baker, was, when roasted, the best he had ever tasted; the tendons of its long legs are valued by the Arabs as thread for sewing leather, and as strings for their musical instruments; while its leg bones, which differ from those of other ruminants in being solid, are largely used in England in the manufacture of buttons and other articles of bone.

**GIRALDI**, GIGLIO GREGORIO, or Lilius Gregorius Gyraldus, one of the scholars and poets of the golden age of Italian literature, was born June 14, 1479, at Ferrara. He died at Ferrara in February, 1552; and his epitaph makes touching and graceful allusion to the sadness of his end. Giraldi was a man of very extensive erudition; and numerous testimonials to his profundity and accuracy have been given, both by contemporary and by later scholars.

**GIRALDI**, GIOVANNI BATTISTA, surnamed CYNTHIUS, CINTHIO, or CINTIO, Italian novelist and poet, born at Ferrara in November, 1504, where on December 30, 1573, he died. Besides an epic entitled *Ercole* (1557), in twenty-six cantos, Giraldi wrote nine tragedies, the best known of which *Orbecche*, was produced in 1541. Of the prose works of Giraldi the most important is the *Hecatommithi* or *Ecatomiti*, a collection of tales told somewhat after the manner of Boccaccio, but still more closely resembling the novels of Giraldi's contemporary Bandello, only much inferior in workmanship to the productions of either author in vigor, liveliness, and local color. They have a peculiar interest to students of English literature, as having furnished, whether directly or indirectly, the plots of *Measure for Measure* and *Othello*.

**GIRALDUS CAMBRENSIS**. See **BARRI**.

**GIRARD**, PHILIPPE HENRI DE, a celebrated French mechanic, was born at Lourmarin, in the department of Vaucluse, February 1, 1775. In his early life he manifested a strong aptitude for mechanical invention, and he also at that time devoted his attention to botany, painting, and literature. In 1804 he and his brother took out a patent for what is known as the fountain lamp; and at the "Exposition" of 1806 he was awarded a gold medal for his one-cylindred direct acting steam engine. Napoleon having in 1810 decreed a reward of one million francs to whoever should invent a machine for the spinning of flax equally successful with those in use for the spinning of hemp, Girard, after a course of experiments, invented and patented a flax-spinning machine. In 1813 he established a flax mill at Paris and another at Charonne, in both of which he made use of his machine; but although he was declared to have earned the reward offered for the invention the fall of Napoleon in 1815 left the decree unfulfilled. Girard, who expected that the expenses connected with his experiments would be met by the promised premium, now got into serious money difficulties, and had to leave



France for Austria, where, besides establishing a flax mill at Hirtenberg, he built the first line of steamships on the Danube. In 1825, at the invitation of the Emperor Alexander I. of Russia, he went to Poland, where he erected a flax manufactory, round which grew up a village which received the name of Giradow. He was also appointed chief engineer of the mines of Poland. In 1844 he returned to Paris, and exhibited at the Exposition a large number of inventions, including a machine for combing flax, a machine for making gunlocks, several new improvements in guns, a piano piano of double octaves, and a new instrument called the *Tremolophone*. For his inventions connected with the manufacture of flax a gold medal was decreed to him by the jury; and in 1845 the Society of Inventions awarded him a sum which raised the pension he received from the Russian Government to 6,000 francs. Besides the inventions already mentioned, Girard was the author of a large number of others, many of them of considerable importance in connection with various departments of industrial machinery. He died at Paris, August 26, 1845. A pension of 6,000 francs was bestowed in 1857 on his only surviving brother, and another on his niece.

GIRARD, STEPHEN, philanthropist, was born at Bordeaux, France, on May 21, 1750. At the age of thirteen he commenced life as a sailor, and followed his vocation with such assiduity that he was enabled, before the French requisitions of age and service allowed, to become master and captain, in October, 1773. His first mercantile venture was to St. Domingo in February, 1774, whence he proceeded in July to the then colony of New York. After trading for three years between New York, New Orleans, and Port au Prince, he went to Philadelphia in May, 1777, and gave up the sea for a mercantile career. While he was engaged most successfully in the prosecution of an extensive trade, the yellow fever, in its most malignant type, broke out in Philadelphia, sweeping away one-sixth of its population. When, during its height, a hospital was established, for which it seemed almost impossible to secure competent management, Girard devoted himself personally, fearless of all risks, to the care of the sick and the burial of the dead, not only in the hospital, of which he became manager, but throughout the city, supplying the poorer sufferers with money and provisions. Two hundred children, made orphans by the ravages of the fever, were in a great measure thrown upon his care. From this period his success, commercially and financially, was unexampled. He gave a portion of his time to the management of municipal affairs for several years, and rendered efficient service as warden of the port and as director of many public institutions. On the dissolution of the Bank of the United States, he instituted what is known now as the Girard Bank. During the war of 1812 "he rendered valuable services to the Government by placing at its disposal the resources of his bank at a time of difficulty and embarrassment, subscribing to a large loan which the Government had vainly sought to obtain." Girard added to his other avocations that of a practical agriculturist. He died December 26, 1831.

Girard College was founded by him for the education and support of the poor white orphans of his adopted city. His fortune amounted to about seven and a half millions of dollars. After specific legacies of two millions for the erection and endowment of the college, \$140,000 to his relatives, \$300,000 to the State for internal improvements, \$500,000 to the city of Philadelphia to improve its eastern front, \$116,000 to public charities, and various annuities and legacies, he bequeathed the residue of his estate to the city of Phila-

delphia, mainly for the improvement and maintenance of the college. The most minute directions were given by Girard in regard to the buildings to be erected, and the admission and management of the inmates. He specifically requires that the orphans be instructed in the purest principles of morality.

GIRARD, the county seat of Crawford county, Kansas, twenty-six miles southwest of Fort Scott, at the intersection of three railroads, is a thriving town of 3,000 people. It contains seven factories with an invested capital of \$100,000; three schools costing \$40,000; and eight churches. The city is lighted by electricity and owns its own water-works.

GIRARDIN, MADAME EMILE DE, a French authoress, was born at Aix-la-Chapelle, January 26, 1804, and died at Paris June 29, 1855. In 1822 she obtained peculiarly honorable mention from the Academy for a poem on the *Devotion of the Sisters of St. Camille at the Siege of Barcelona*; and not long afterward she published two volumes of miscellaneous pieces, *Essais poétiques* (1824) and *Nouveaux essais poétiques* (1825). To the close of her life she continued to appear both as a novelist and as a writer for the stage, and in both departments she reaped a wide popularity through the wit and emotional force of her productions. *Contes d'une vieille fille à ses neveux* (1832), *La canne de Monsieur de Balzac* (1836), and *Il ne faut pas jouer avec la douleur* (1853) are among the best known of her romances; and her dramatic pieces include *L'École des journalistes* (1840), *Judith* (1843), *Cléopâtre* (1847), *C'est la faute du mari* (1851), *Lady Tartufe* (1853), *La joie fait peur* (1854), *Le chapeau d'un horloger* (1854), and *Une femme qui déteste son mari*, which did not appear till after the author's death. In the literary society of her time Madame Girardin exercised no small personal influence, and among the frequenters of her drawing-room were Gautier and Balzac, Alfred de Musset and Victor Hugo.

GIRARDIN, SAINT-MARC, a politician and man of letters, whose real name was Marc Girardin simply, was born at Paris in 1801, and died at Morsang-sur-Seine on April 11, 1873. In 1828 he began to contribute to the *Journal des Débats*, on the staff of which he remained for nearly half a century. In 1844 he was elected a member of the Academy. During the revolution of February, 1848, Girardin was for a few days a minister, but after the establishment of the republic he was not re-elected deputy, nor did he take any prominent part in politics during the second empire save with his pen. After the war of 1870 he was returned to the Bordeaux assembly by his old department—the Haute Vienne. His Orleanist tendencies, and his objections to the republic, were strong, and though he at first supported Thiers, he afterward became a leader of the opposition to the president. He died, however, before Thiers was actually driven from power.

GIRARDON, FRANÇOIS, a sculptor, whose works are typically characteristic of the epoch of Louis XIV., was born at Troyes in 1628, and died in the Louvre in 1715.

GIRARDVILLE, a Pennsylvania town, situated in the mining regions of Schuylkill county, from which large quantities of anthracite coal are shipped. It has railway, banking and telegraph facilities, and its population (1890) is estimated at about 5,000. The principal business of the place is, in one way or another, dependent on the coal trade.

GIRASOL, a precious stone, exhibiting in strong lights a peculiar and beautiful reflection of bright red or yellow light, which seems to come from the interior of the stone. From this it derives its name (Ital., "sun-turning"). There are different kinds of girasol, variously



referred by mineralogists to quartz and opal, species which, however, are very nearly allied. One kind is also known as *Fire Opal*, which is found only at Zimapan, in Mexico, and in the Faroe Islands. The Mexican specimens are of a rich topaz yellow color, and the reflection is very bright. Another kind is the *Quartz Resinite* of Haiüy, so called because of its characteristic resinous fracture. It is found of various colors, sometimes of a fine yellow or emerald green, more generally bluish-white. For a specimen of extraordinary brilliancy, not an inch and a half in diameter, \$5,000 has been refused. The ancients held this stone in high estimation, and called it *Asteria* (Gr. *aster*, "a star"). They obtained it both from Caramania and from India. The brightest are at present brought from Brazil, but fine specimens are also obtained in Siberia. Imitation girasols are made of glass in which a little oxide of tin is mixed.—The name girasol is sometimes given to a kind of sapphire, also called *Asteria sapphire*, exhibiting a similar reflection of light, and sometimes to *Sun-stone*, an aventurine felspar. According to Castellani, many minerals can be made to reflect light from the interior in the same way as girasol, when they are carefully cut in a spherical or semi-spherical form. He instances adularia, hydrophane (a variety of opal), milky corundum, some kinds of chalcedony, Brazilian chrysolite, etc.

**GIRDLE**, a band of leather or other material worn round the waist, either to confine the loose and flowing outer robes so as to allow freedom of movement, or to fasten and support the garments of the wearer. In southern Europe and in all Eastern countries the girdle was and still is an important article of dress. Among the Romans it was used to confine the *tunica*; and so general was the custom that the want of a girdle was regarded as strongly presumptive of idle and dissolute propensities. It also formed a part of the dress of the Greek and Roman soldier; the phrase *cingulum deponere*, to lay aside the girdle, was an equivalent to quitting the service. It was used as now in the East to carry money in.

Girdles and girdle-buckles are not found in early Celtic interments, nor are they frequent in Gallo-Roman graves. But in Frankish or Burgundian graves they are almost constantly present, often ornamented with plaques of bronze or silver, and the clasps or mountings chased or inlaid with various ornamental designs, occasionally including figures of the cross, and rude representations of Scripture subjects. In later times girdles are frequently represented on brasses and monumental effigies from the twelfth to the sixteenth century. They were either of leather or of woven materials, often of silk and adorned with gold and gems. Among the sumptuary regulations of Edward III. of England there were prohibitions against wearing girdles of gold and silver, unless the wearer was of knightly rank or worth £200 a year. Similar regulations against extravagance in girdles are occasionally found to the sixteenth century. The brasses of the fifteenth century present many beautiful examples of ladies' girdles which were often worn like that of the knight with the ornamental end hanging down in front, sometimes with both ends depending from a large clasp or ornamental fastening in the center. Allusions to the girdle are common in the poetry of the sixteenth and seventeenth centuries. The purse, the dagger, the rosary, the pen and inkhorn, and the bunch of keys were carried suspended from it, and hence it was an ancient custom for bankrupts or insolvent persons to put off and surrender their girdles in open court. It is recorded that the widow of Philip I., duke of Burgundy, renounced her right of succession by putting off her girdle upon the duke's tomb. The

girdle, which was a very important element in the dress of the Levitical priesthood, does not appear as an ecclesiastical vestment in the Christian church until the eighth century. Germanus, who died in 740, mentions the girdle worn by deacons; and Hrabanus Maurus in the succeeding century speaks of the girdle as one of the regular vestments, and refers to its symbolism. Some centuries later the church had to discountenance extravagance in this article of attire, and splendor in the decoration of girdles was denounced as secular and unbefitting the ecclesiastical character.

**GIRDLE OF VENUS** (*Cestum veneris*), one of the *Acalephæ*, inhabiting the Mediterranean, gelatinous, of a ribbon-like shape, sometimes five or six feet long by about two inches wide; although considered with reference to the structure of the animal, the apparent length is really its breadth, and the apparent breadth its length. The mouth is situated in the middle of the inferior edge, and the stomach is imbedded in the gelatinous substance. The edges are fringed with cilia, by the movements of which the creature seems to be propelled in the water. It exhibits iridescent colors by day, and phosphorescence by night. Its substance is so delicate that a perfect specimen can with difficulty be obtained.

**GIRGEH, GIRGA, or JIRJEH**, a town of Upper Egypt, situated on the left bank of the Nile, about nine miles northwest of the ancient city of Abydos. It owes its name to the Coptic monastery of St. George or Girgis, and is the seat of a Coptic bishop, possesses eight mosques and a Roman Catholic monastery which ranks as the oldest in Egypt, and numbers from 8,000 to 10,000 inhabitants, of whom about 500 are Christians.

**GIRGENTI**, a city in the south of Sicily, at the head of a province of its own name, occupies a fine position about three miles from the coast on a platform of Mount Camicus, more than 1,100 feet above the level of the sea. It lies about sixty miles south-southeast of Palermo, with which it is connected by a railway ninety miles long. As seen from the lower ground Girgenti presents a grandiose but somber appearance, with its buildings rising in close array from ancient substructions and the steep rocks of the mountain; but within it is for the most part mean, monotonous, and melancholy, the streets with few exceptions being confined, irregular, steep, and ill-paved, and the houses all presenting the same gray-brown walls, the same reddish roofs, and same narrow doors and narrow windows. In the history of Girgenti there is little of note; the historical interest of the district gathers round the splendid ruins of the older Agrigentum, which lies between Girgenti and the sea.

**GIRODET DE ROUSSY, ANNE LOUIS**, better known as Girodet-Trioson, was born at Montargis, January 5, 1767. After some preliminary studies under a painter named Luquin, Girodet entered the school of David, and at the age of twenty-two he successfully competed for the Prix de Rome. He was regarded as the first of the Romantic school, and from 1799 to 1810 he was the most popular—perhaps deservedly so—painter of the Romantics. His productions during this period have been the subject of many contending criticisms. His powers after 1818 began to fail, and his habit of working at night and other excesses told upon his constitution; in the Salon of 1812 he exhibited only a *Tête de Vierge*; in 1819 *Pygmalion et Galaté* showed a still further decline of strength; and in 1824—the year in which he produced his portraits of Cathelineau and Bonchamps—Girodet died on December 9, aged fifty-eight.

**GIRONDE**, a maritime department in the southwest of France, formed from four divisions of the old province of Guyenne, viz., Bordelais, Bazadais, and parts of Périgord and Agénois. It is bounded on the north



by the département of Charente-Inférieure, east by those of Dordogne and Lot-et-Garonne, south by that of Landes, and west by the Bay of Biscay. It takes its name from the river or estuary of the Gironde formed by the union of the Geronna and Dordogne. The département divides itself naturally into a western and an eastern portion. The former, which is termed *Les Landes*, occupies more than a third of the département, and consists chiefly of morasses, or of sandy and unfruitful downs. The downs stretching along the sea-coast have, however, been now planted with pines, which, binding the sand together by means of their roots, afford an efficacious protection against the encroachments of the sea. Near the coast are two extensive lakes, Carcans and Lacanau, communicating with each other, and with the bay of Arcachon, near the southern extremity of the département. The Bay of Arcachon contains numerous islands, and on the land side forms a vast shallow lagoon, a considerable portion of which, however, has been drained and converted into arable land. The eastern portion of the département consists chiefly of a succession of hill and dale, and, especially in the valley of the Gironde, is very fruitful. The chief town is Bordeaux. The total area is 3,761 square miles; and the population in 1866 was 701,855, and in 1880 nearly 800,000.

**GIRONDISTS** (Fr. *Girondins*), the name given during the French Revolution to the moderate Republican party. When the Legislative Assembly met in October, 1791, the Gironde département chose for its representatives Vergniaud, Guadet, Gensonné, Grangeneuve, and Ducos, all of whom soon acquired great influence by their rhetorical talents and political principles. They were joined by Brissot's party and the adherents of Roland, as well as by several leaders of the Center, such as Condorcet, Fauchet, Lasource, Isnard, and Henri La Rivière, and for some time had a Parliamentary majority. From this nucleus grew the so-called Girondist party, which for a time exerted a powerful influence in the Revolution, but which came to an unfortunate end, nearly all the leaders being guillotined. The advance of the Austrian and Prussian invaders threw the influence into the hands of the Jacobins, who alone possessed vigor enough to "save the revolution." The great *émeute* of the 10th of August finally assured their triumph, which vented itself in such infamies as the September massacres. Next followed the National Convention and the trial of the king. The Girondists tried to save the king's life by appealing to the sovereign people. The fall of Roland and the ascendancy of Robespierre followed. Dumouriez, to save his head, rode over into the Austrian camp, and the famous Committee of Public Safety was created. Of its members not one was a Girondist. The last effort of the party was an ineffectual attempt to impeach Marat, who, however, on the 2d of July overthrew the party, arresting as many as thirty-one deputies. The majority had already escaped to the provinces. In the départements of Eure, Calvados, all through Brittany, and at Bordeaux and elsewhere in the southwest the people rose in their defense, but the movement was soon crushed by the irresistible energy of the Mountain, now triumphant in the Convention.

On October 1, 1793, the prisoners were accused before the Convention of conspiring against the republic with Louis XVI., the royalists, the Duke of Orleans, Lafayette, and Pitt, and it was decreed that they should be brought before the Revolutionary Tribunal. On the 24th their trial commenced. The accusers were such men as Chabot, Hébert, and Fabre d'Eglantine. The Girondists defended themselves so ably that the Convention on the 30th was obliged to decree the closing of the

investigation. That very night, Brissot, Vergniaud, Gensonné, Ducos, Fonfrède, Lacaze, Lasource, Valazé, Sillery, Fauchet, Duperret, Carra, Lehardy, Duchatel, Gardien, Boileau, Beauvais, Vigée, Duprat, Mainvielle, and Antiboul were sentenced to death, and, with the exception of Valazé, who stabbed himself on hearing his sentence pronounced, all perished by the guillotine. On their way to the Place de Grève, in the true spirit of French republicanism, they sang the *Marseillaise*. Coustard, Manuel, Cussy, Noel, Kersaint, Rabout St. Etienne, Bernard, and Mazuyer went later to the same fate. Biroteau, Grangeneuve, Guadet, Salles, and Barbaroux ascended the scaffold at Bordeaux; Lidon and Chambon at Brives; Valady at Périgueux; Dechézeau at Rochelle. Rebecqui drowned himself at Marseilles, Fétion and Buzot stabbed themselves, and Condorcet poisoned himself. Sixteen months later, after the fall of the Terrorists, the outlawed members, including the Girondists Lanjuinais, Defermon, Pontécoulant, Louvet, Isnard, and La Rivière, again appeared in the Convention. See Lamartine's *Histoire des Girondins* (8 vols. Paris, 1847); and Guadet's *Les Girondins* (new ed. 1889).

**GIRTIN, THOMAS**, one of the greatest of the earlier English landscape-painters in water-colors, was born in London, February 18, 1775, and died November 9, 1802. He was a close friend and fellow-student of Turner; and to them many improvements in water-color painting are due. Girtin struck out a bolder style than had been attempted, attained great richness of color and breadth, but was somewhat careless of detail, and sometimes inaccurate in drawing. His best works are panoramic views of London and of Paris.

**GIRTON COLLEGE**, the most notable college for women in England, was instituted at Hitchin in 1869, but removed to Girton, near Cambridge, in 1873. Instruction is given in divinity, modern languages, classics, mathematics, moral science, natural science (including physiology and chemistry), history, vocal music. There are about thirty lecturers, mostly connected with Cambridge University. The mistress and five resident lecturers are ladies. The students, who number above 100, are admitted after an entrance examination; the ordinary course extends over three years, half of each year being spent in college. "Degree Certificates" are granted to those who satisfy their examiners as to their proficiency according to the standard of the examinations for the B. A. of Cambridge University; \$175 per term covers all college charges.

**GIRVAN**, a burgh of barony and market-town, in the county of Ayr, Scotland, is situated at the mouth of the river Girvan, twenty-one miles southwest of Ayr, and nearly opposite Ailsa Craig, a rocky island ten miles distant.

**GISBORNE**, a post-town of New Zealand, in the North Island, is situated on the river Turanganui (fine bridge, 1885), 250 miles southeast of Auckland, with which city it has steamer communication. It is the port of entry for Poverty Bay, a name given by Captain Cook in 1769, and sometimes still retained for the town; only small vessels can come up to the wharves, but in 1889 a harbor, to cost \$1,000,000, was in course of construction. In 1886 petroleum was struck in the neighborhood. Population (1890), 4,000.

**GISORS**, a town of France, département of Eure, is situated in a pleasant valley on the Epte, forty-five miles east-northeast of Paris.

**GITSCHIN**, the chief town of a circle in Bohemia, is situated on the Cydlina and on the North-West Austrian railway, fifty miles northeast of Prague. Gitschin was made the capital of the duchy of Friedland by Wallenstein in 1627, at which time it contained only 200 houses.



Wallenstein was interred at the neighboring Carthusian monastery, but in 1639 the head and right hand were taken by General Banér to Sweden, and in 1702 the other remains were removed by Count Vincent of Waldstein to his hereditary burying ground at Münchengrätz. At Gitschin the Prussians gained a great victory over the Austrians, June 29, 1866. Population, 7,000.

GIULIO ROMANO. See PIPPI.

GIUNTA PISANO, the earliest Italian painter whose name is found inscribed on an extant work, exercised his art from 1202 to 1236; he may perhaps have been born toward 1180 in Pisa, and died in or soon after 1236.

GIURGEVO, in Roumanian *Giurgiu* or *Shursha*, a town of Roumania (formerly of Lower Wallachia) at the head of the district of Vlashka, lies on the left or northern bank of the Danube, over against Rustchuk, in Bulgaria, and is distant about forty miles from Bucharest, with which it has been connected by railway since 1869. The population in 1889 was about 18,000.

GIUSTI, GIUSEPPE, Tuscan satirical poet, was born at Monsummano, a small village of the Valdinievole, on May 12, 1809. In 1826 he went to study law at Pisa; but, disliking the study, he spent eight years in the course, instead of the customary four. In 1834 Giusti, having at last entered the legal profession, left Pisa to go to Florence, nominally to practice with the advocate Capoquadri, but really to enjoy life in the capital of Tuscany. He fell seriously in love a second time, and as before was abandoned by his love. It was then he wrote his finest verses, by means of which, although his poetry was not yet collected in a volume, but for some years passed from hand to hand, his name gradually became famous. The greater part of his poems were published clandestinely at Lugano, at no little risk, as the work was destined to undermine the Austrian rule in Italy. After the publication of a volume of verses at Bastia, Giusti thoroughly established his fame by his *Gingillino*, the best in moral tone as well as the most vigorous and effective of his poems. Giusti entered heart and soul into the political movements of 1847 and 1848. He fell afterward from the high position he had held in public estimation, and in 1848 was regarded as a reactionary. His friendship for the Marquis Gino Capponi, who had taken him into his house during the last years of his life, and who published after Giusti's death a volume of illustrated proverbs, was enough to compromise him in the eyes of such men as Guerrazzi, Montanelli, and Niccolini. On May 31, 1850, he died at Florence in the palace of his friend.

GIUSTINIANI, the name of a prominent Italian family which originally belonged to Venice, but established itself subsequently in Genoa also, and at various times had representatives in Naples, Corsica, and several of the islands of the Archipelago.

In the Venetian line the following are most worthy of mention: 1. LORENZO (1380-1465), the Laurentius Justinianus of the Roman calendar, at an early age entered the congregation of the canons of Saint George in Alga, and in 1433 became general of that order. He died in January 8, 1465. (2) LEONARDO (1388-1446), brother of the preceding, was for some years a senator of Venice, and in 1443 was chosen procurator of St. Mark. He translated into Italian Plutarch's *Cinna* and *Lucullus*, and was the author of some poetical pieces, amatory and religious, as well as of rhetorical prose compositions. (3) BERNARDO (1408-1489), son of Leonardo, was a pupil of Guarino and of George of Trebizond, and entered the Venetian senate at an early age. He served on several important diplomatic missions both to France and Rome, and, about 1485, became one of the council of ten. His orations and letters were published in 1492; but his title to any measure of

fame he possesses rests upon his history of Venice, *De Origine Urbis Venetiarum rebusque ab ipsa gestis historia*. (4) PIETRO, also a senator, lived in the sixteenth century, and wrote a *Historia rerum Venetarum* in continuation of that of Bernardo. He was also the author of chronicles *De Gestis Petri Mocenigi* and *De Bello Venetorum cum Carolo VIII*. The latter has been reprinted in the *Script. Rer. Ital.*, vol. xxi.

Of the Genoese branch of the family, the most prominent members were the following: (1) PAOLA DI MONIGLIA (1444-1502), a member of the order of Dominicans, was, from a comparatively early age, prior of their convent at Genoa. As a preacher he was very successful, and his talents were fully recognized by successive popes, by whom he was made master of the sacred palace, inquisitor-general for all the Genoese dominions, and ultimately bishop of Scio and Hungarian legate. He was the author of a number of Biblical commentaries (no longer extant), which are said to have been characterized by great erudition. (2) AGOSTINO (1470-1536), was born at Genoa, and spent some wild years in Valencia, Spain. Having in 1487 joined the Dominican order, he gave himself with great energy to the study of Greek, Hebrew, Chaldean and Arabic, and in 1514 commenced the preparation of a polygot edition of the Bible. As bishop of Nebbio in Corsica, he took part in some of the earlier sittings of the Lateran council (1516-17), but in consequence of party complications, withdrew to his diocese, and ultimately to France, where he became a pensioner of Francis I., and was the first to occupy a chair of Hebrew and Arabic in the university of Paris. After an absence from Corsica for a period of five years, during which he visited England and the Low Countries, and became acquainted with Erasmus and More, he returned to Nebbio about 1522, and there remained, with comparatively little interruption, till in 1536, when, while returning from a visit to Genoa, he perished in a storm at sea.

The name Giustiniani has also been borne by the following:—(1) POMPEIO (1569-1616), a native of Corsica, who served under Alessandro Farnese and the marquis of Spinola in the Low Countries, where he lost an arm, and, from the artificial substitute which he wore, came to be known by the soubriquet *Bras de Fer*. He also defended Crete against the Turks; and subsequently was killed in a reconnoissance at Friuli. (2) GIOVANNI (1513-1556), born in Candia, translator of Terence's *Andria* and *Eunuchus*, of Cicero's *In Verrem*, and of Virgil's *Æneid*, l. viii. (3) ORSATTO (1538-1603), Venetian senator, translator of the *Œdipus Tyrannus* of Sophocles, and author of a collection of *Rime*, in imitation of Petrarch. He is regarded as one of the latest representatives of the classic Italian school. (4) GERONIMO, a Genoese, flourished during the latter half of the sixteenth century. He translated the *Alcestis* of Euripides and three of the plays of Sophocles; and wrote two original tragedies, *Jephthe* and *Christo in Passione*. (5) VINCENZO, who in the beginning of the seventeenth century built the Roman palace and made the art collection which are still associated with his name (see *Galleria Giustiniana*, Rome 1631). The collection was removed in 1807 to Paris, where it was to some extent broken up. In 1815, all that remained of it, about 170 pictures, was purchased by the king of Prussia and removed to Berlin, where it forms a portion of the royal museum.

GIVET, one of the strongest fortified towns of France, on the Belgian frontier, situated in the department of Ardennes, on the river Meuse, forty miles north-northeast of Mezières. The Eastern French railway connects it with Rheims, and the Belgian railways connect it with Namur and Charleroi. Pop., 8,000.



GIVORS, a town of France, department of Rhône, is situated on the Rhone and the canal of Rive-de-Gier, near the railway between Lyons and St. Etienne, fourteen miles south of Lyons. Population, 10,856.

GLACIAL PERIOD, or ICE AGE, is a term used in geology to designate that period the records of which are included in the Pleistocene System. "Glacial period" and "Pleistocene period" are in fact synonymous as regards all northern and temperate regions—the former term being used when the prominent climatic characteristics of the period are thought of, while the latter is employed with reference to its life. A short account may be given of the relics which furnish evidence of former glacial conditions having obtained in many regions that are now in the enjoyment of temperate climates. It is chiefly in the northern parts of Europe and North America, and the hilly and mountainous districts of more southern latitudes, that the glacial deposits, properly so called, are developed. These deposits consist partly of morainic materials, erratics, etc., and partly of marine, fresh-water and terrestrial accumulations. The most important member of the series is *Boulder-clay* or, as it is often termed, *till*. This is an unstratified clay, full of ice-worn stones and boulders, which is believed to have been formed and accumulated under glacier-ice. Several distinct and separate sheets of boulder-clay have been recognized, divided from each other by intercalated "interglacial beds," which last are often fossiliferous. The lowest and oldest boulder-clay covers vast areas in the British Islands and northern Europe—extending south as far as the Bristol Channel and the valley of the Thames in England, and to the foot of the Harz Mountains, etc., in middle Germany. Boulder-clay of the same age spreads over the low grounds of Switzerland, and extends from the great Alpine valleys for many miles into the circumjacent low-lying regions. Similar ground-moraines have been met with in all the mountainous and hilly tracts of Europe, as in central France, the Pyrenees, the Spanish Sierras, the mountains of Corsica, the Apennines, the Vosges, the Black Forest, the Erzgebirge and other ranges of Germany, the Carpathians, etc. The rock-surfaces on which the boulder-clay rests are often smoothed and striated, or much crushed and broken, while the hills and mountain-slopes in regions where boulder-clay occurs give evidence of having been abraded and smoothed by glacial action. At the time the boulder-clay was formed, Scotland, Ireland, the major portion of England, Scandinavia, Denmark, Holland, the larger half of Belgium, Germany as far south as Leipzig, and vast regions in Poland and Russia were covered with a great *mer de glace*. Contemporaneously with this ice-sheet all the mountain-regions of the central and southern regions of the Continent nourished extensive snowfields and glaciers, which last flowed out upon the low ground often for very great distances. Thus, Lyons stands upon old moraines which have been carried down from the mountains of Dauphiné and Savoy. The interglacial deposits point to great changes of climate when the snowfields and glaciers melted away, and temperate conditions of climate supervened, as is shown by the geographical distribution of these deposits, and by the character of the plant and animal remains which they have yielded. The youngest boulder-clay, overlying, as it does, such interglacial beds, proves that the glacial period closed with another advance and final retreat of the Scandinavian ice-sheet and the great glaciers of the Alps, etc. The terminal moraines of the last ice-sheet do not come so far south as those of the first and greatest *mer de glace*. These moraines show that the ice covered the Scandinavian peninsula, filled up the Baltic,

invaded north Germany, and overflowed Finland and wide regions in the north of Russia. Similarly in the Alps, etc., the last great extension of the glaciers was not equal to that of the first.

The boulder-clays are not the only evidence of glacial conditions. Besides those accommodations and the scratched and crushed rock-surfaces already referred to, we encounter numerous erratics, GIANTS KETTLES (*q.v.*), clays with Arctic marine shells and erratics (in Scotland, Prussia, etc.)—the organic remains associated with the glacial deposits often affording strong evidence of cold conditions. The following table shows the general succession of the glacial deposits in several parts of Europe:

#### SCOTLAND—

6. Valley-moraines and fluvio-glacial gravels = small local glaciers.
5. Kames, erratics, fluvio-glacial deposits, laid down during retreat of last general ice-covering.
4. Clays, etc., with Arctic marine shells, occurring up to a height of 100 feet = deposits belonging to the period of retreat of *mer de glace*, and contemporaneous to a large extent with those of 5.
3. Upper boulder-clay = *moraine profonde* of latest *mer de glace*.
2. Interglacial beds = disappearance of cold conditions; clothing and peopling of the land-surface with temperate fauna and flora; subsequent submergence to not less than 500 or 600 feet below present level.
1. Lower boulder-clay with intercalated interglacial fossiliferous beds = the product of more than one *mer de glace*. The lowest clay marks the period of greatest glaciation.

#### ENGLAND AND IRELAND—

6. Valley-moraines and fluvio-glacial gravels.
- 5 and 4. Kames or eskers, erratics; fluvio-glacial deposits.
3. Upper boulder-clay of last *mer de glace*.
2. Interglacial beds, marine and fresh-water. Disappearance of glacial conditions; land-surface at first; subsequent submergence to considerable extent.
1. Lower boulder-clays with intercalated aqueous deposits, indicating probably same conditions as 1 in Scottish series.

#### NORTHERN EUROPE—

4. Sand and gravel; erratics; shelly marine clays (in Baltic area).
3. Upper boulder-clay and terminal moraines of last *mer de glace*.
2. Interglacial beds, partly fresh-water and terrestrial, partly marine.
1. Lower boulder-clay = greatest extension of ice.

#### SWITZERLAND—

4. Fluvio-glacial gravels in terraces.
3. Moraines and upper boulder-clay of last great glaciers.
2. Interglacial beds, with mammalian remains, etc.
1. Lower boulder-clay.

#### CENTRAL FRANCE—

4. Fluvio-glacial gravels.
3. Moraines.
2. Interglacial beds, richly fossiliferous.
1. Ground-moraines (Mont Dore).

In North America glacial deposits are developed upon a great scale, and there, as in Europe, the boulder-clays are separated by interglacial deposits. The northern part of the continent was drowned in ice during the greatest extension of the *mer de glace*, the ice flowing south into New Jersey, whence its front extended north-west through Pennsylvania, after which it trended south-west through Ohio and Indiana to reach the thirty-eighth parallel of latitude in Illinois. It then appears to have swept away to the northwest in the direction of the Missouri valley. The latest American *mer de glace* did not come so far south—its terminal moraines being well developed in Minnesota, Wisconsin, Michigan, etc. Evidence of former excessive glacial conditions has been met with in many other parts of the world—old moraines, etc., having been detected in the Caucasus, the mountains of Asia Minor, the Lebanon, the Himalayas, etc., in Asia; in the Atlas, the Kagu and Krom Mountains, etc., in Africa; in the Andes, Tierra del Fuego, etc., in South America; in New Zealand, etc.,



GLACIER, a name given to a mass of ice, having its origin in the hollows of mountains, where perpetual snow accumulates, but which makes its way down toward the lower valleys, where it gradually melts, until it terminates exactly where the melting, due to the contact of the warmer air, earth, and rain of the valley, compensates for the bodily descent of the ice from the snow reservoirs of the higher mountains.

The diminution of temperature as we ascend the slopes of mountains, is indicated by successive zones of vegetation, and finally by the occurrence of perpetual snow. It was first shown by Baron Humboldt and Von Buch that the limit of perpetual snow depends principally on the temperature of the summer, and not upon that of the whole year.

A glacier usually protrudes into a valley far below the limits of perpetual snow, and terminates amidst a wilderness of stones borne down upon its surface and deposited by its fusion. This earthy and rocky rubbish is termed moraine matter. Lying in front of the lower end of a glacier, it marks in a characteristic and certain manner the greatest limit of extension which the glacier has at any one time attained. Sometimes a glacier is seen to have withdrawn very far within its old limits, leaving a prodigious barren waste of stones in advance of it, which, being devoid of soil, nourishes not one blade of grass. At other times the glacier pushes forward its margin beyond the limit which it has ever reached (at least within the memory of man), tears up the ground with its icy plowshare, and shoves forward the yielding turf in wrinkled folds, uprooting trees, moving vast rocks, and scattering the walls of dwelling-houses in fragments before its irresistible onward march.

The lower end of a glacier is usually steep,—sometimes with a dome-shaped unbroken outline, more frequently broken up by intersecting cracks into prismatic masses which the continued action of the sun and rain sharpen into pyramids, often assuming (as in the glacier of Bossons at Chamouni) grotesque or beautiful forms. From a vault in the green-blue ice, more or less perfectly formed each summer, the torrent issues which represents the natural drainage of the valley, derived partly from land springs, partly from the fusion of the ice. The united or crevassed condition of the glacier generally depends almost entirely on the slope of its bed. If it incline rapidly, numerous transverse fissures are formed from the imperfect yielding of the ice during its forced descent along its uneven channel. These cracks often extend for hundreds of yards, and may be hundreds of feet in depth; but their greatest depth is not accurately known, since they are rarely quite vertical. In many cases, however, the crevasses are comparatively few in number, and the glacier may be readily traversed in all directions. This is especially the case if a glacier of considerable dimensions meets with any contraction in its course. The ice is embayed and compressed, and its slope lessens, just as in the case of a river when it nears a similar contraction preceding a fall. Such level and generally traversable spaces may be found about the middle regions of the Mer de Glace, the lower glacier of Grindelwald, the lower glacier of the Aar, and in many other cases. The last-named glacier is perhaps the most remarkable even and accessible of any in Switzerland. The slope of its surface is in many places only  $3^{\circ}$ . The Pasterzen glacier in Carinthia is even less inclined. It is in such portions of a glacier that we commonly find internal cascades, or "moulins." These arise from the surface water being collected into a considerable mass by a long course over its unbroken surface, and then precipitated with violence into the first fissure it meets with. The descending cascade keeps open its channel,

which finally loses the form of a fissure, presenting that of an open shaft, often of immense depth.

Nearly connected in their origin with the internal cascades are the "gravel cones," occasionally seen on the surface of glaciers, which appear to be formed in this way. A considerable amount of earthy matter derived by the superficial water-runs from the moraine accumulates in heaps in the inequalities of the ice, or at the bottom of the "moulins." As the glacier surface wastes by the action of the sun and rain, these heaps are brought to the surface, or rather the general surface is depressed to their level. If the earthy mass be considerable, the ice beneath is protected from the radiation of the sun and from the violent washing of the rain; it at length protrudes above the general level of the glacier, and finally forms a cone which appears to be entirely composed of gravel, but is in fact ice at the heart, with merely a protecting cover of earthy matter. These singular cones are very well seen on the glacier of the Aar, but on most others they are comparatively rare. The similar protective action of large stones detached from the moraines and lying on the surface of the ice often produces the striking phenomenon of "glacier tables." Stones of any considerable size almost invariably stand upon a slightly elevated pillar of ice; but when they are broad and flat they occasionally attain a height of six and even of twelve feet above the general level.

The superficial waste of a glacier is thus a very important phenomenon. Owing to it the body of the ice has its vertical thickness rapidly diminishing during the heats of summer, and, as we have already intimated, the lower end of a glacier has its position determined by the amount of this waste. Suppose a glacier to move along its bed at the rate of three hundred feet per annum, and imagine (merely for the sake of illustration) its yearly superficial waste to be twenty feet; then the thickness of the glacier will diminish by twenty feet for every three hundred feet of its length, or at the rate of three hundred and sixty feet per mile, so that the longitudinal section of a glacier has the form of a wedge; and however enormous its original thickness, after a certain course we must at length come to the thin end of the wedge; and that the more rapidly as the causes of melting increase toward the lower extremity. These causes are indeed so various that it is difficult to estimate them with accuracy. We have (1) the direct solar heat (2) the contact of warm air, and (3) the washing of rain. All these causes act on the surface and produce the "ablation" of the surface. Besides these, the ice of the glacier wastes somewhat beneath by the contact of the soil and the washing of the inferior streams. This may be called its "subsidence." Further, the natural slope of the rocky bed of the glacier causes any point of the surface to stand absolutely lower each day in consequence of the progressive motion. These three causes united produce the "geometrical depression" of the surface. Principal J. D. Forbes showed how the several effects may usually be distinguished by observation. During the height of summer, near the Montanvert, he found the daily average ablation to be 3.62 inches, the daily subsidence to be 1.63 inches. Seven-tenths of the geometrical depression are due, therefore, to the former cause, and three-tenths to the latter. This is a very large amount, and it is certain that during the colder period of the year, and while the glacier is covered with snow, the subsidence is not only suspended, but the glacier recruits in thickness a portion of its waste during the seasons of summer and autumn. To this subject we shall again return.

The middle region of the great glaciers of the Alps extends from the level of about 6,000 to 8,000 feet



above the sea. The inclination is usually there most moderate — say from  $2\frac{1}{2}^{\circ}$  to  $6^{\circ}$ . But this is not invariably the case. Beyond 8,000 feet we reach the snow-line. The snow-line is a fact as definite on the surface of a glacier as on that of a mountain, only in the former case it occurs at a somewhat lower level. It cannot be too distinctly understood that the fresh snow annually disappears from the glacier proper. Where it ceases entirely to melt, it of course becomes incorporated with the glacier. We have therefore arrived at the region where the glacier *forms*; everywhere below it only *wastes*. This snowy region of the glacier is called in French *névé*, in German *firn*. As we ascend the glacier it passes gradually from the state of ice to the state of snow. The superficial layers are more snowy and white, in fact nearly pure snow; the deeper ones have more color and consistence, and break on the large scale into vast fragments, which at Chamouni are called *seracs*. The *névé* moves, as the glacier proper does, and it is fissured by the inequalities of the ground over which it passes. These fissures are less regular than those of the lower glacier. They are often much wider, in fact of stupendous dimensions, and, being often covered with treacherous snowy roofs, constitute one of the chief dangers of glacier traveling. The constitution of the *névé* may be well studied on the Glacier du Géant, a tributary of the Mer de Glace. The mountain-clefts in which large glaciers lie usually expand in their higher portions (in conformity with the ordinary structure of valleys) into extensive basins in which snow is perpetual, and which therefore contain the *névé*, the true origin and material of the glacier, which is literally the overflow of these snowy reservoirs. The amount of overflow or the discharge of the glacier — upon which depends the extent of its prolongation into the lower valleys — depends in its turn on the extent of the *névé* or collecting reservoir. Glaciers with small reservoirs of necessity perish soon.

The ice of the glacier proper has a very peculiar structure, quite distinct from the stratification of the snow on the *névé* (the relics of its mode of deposit), and one which requires special notice. When we examine the appearance of the ice in the wall of an ordinary crevasse (especially if it be tolerably near the side of the glacier) we are struck with the beautiful vertically laminated structure (first observed by Principal Forbes) which it commonly presents, resembling delicately veined marble in shades varying from bluish-green, through green, to white. When we trace the direction of the planes constituting the laminated structure, by observing them on the surface of the glacier (where they are usually well seen after rain, or in the channels of superficial water-runs), we find that where best developed (or not very far from the sides of the glacier) these laminæ are nearly parallel to the sides, but rather incline from the shore to the center of the ice stream as we follow the declivity of the glacier.

There is something about a glacier which almost inevitably conveys to the mind the idea of a stream. This may be traced in the description of unscientific tourists, of poets, and of some of those who have addressed themselves more seriously to the question of the real nature of these bodies.

The most characteristic and remarkable feature of glaciers is their motion downward from the *névé* toward the lower valley. The explanation of it is by far the most important application of mechanical physics connected with the subject. The principal theories to account for the progressive motion of glaciers which were prevalent previous to 1842, may be briefly characterized as De Saussure's and De Charpentier's,

though each had been maintained long before by the earlier Swiss writers. The first may be called the *gravitation* theory; the latter the *dilatation* theory. Both suppose that the motion of the ice takes place by its sliding bodily over its rocky bed, but they differ as to the force which urges it over the obstacles opposed by friction and the irregularities of the surface on which it moves.

The following quotation from De Saussure explains his views with his usual precision: "These frozen masses, carried along by the slope of the bed on which they rest, disengaged by the water (arising from their fusion owing to the natural heat of the earth) from the adhesion which they might otherwise contract to the bottom — sometimes even elevated by the water — must gradually slide and descend along the declivity of the valleys or mountain slopes which they cover. It is this slow but continual sliding of the icy masses on their inclined bases which carries them down into the lower valleys, and which replenishes continually the stock of ice in valleys warm enough to produce large trees and rich harvests." Very sufficient objections have been urged against this theory. It is evident that De Saussure considered a glacier as an accumulation of icy fragments, instead of a great and continuous mass, throughout which the fissures and "crevasses" bear a small proportion to the solid portion; and that he has attributed to the subglacial water a kind and amount of action for which there exists no sufficient or even probable evidence. The main objection, however, is this, that a sliding motion of the kind supposed, if it commence, must be accelerated by gravity, and the glacier must slide from its bed in an avalanche. The small slope of most glacier valleys, and the extreme irregularity of their bounding walls, are also great objections to this hypothesis.

The dilatation theory ingeniously meets the difficulty of the want of a sufficient moving power to drag or shove a glacier over its bed, by calling in the well-known force with which water expands on its conversion into ice. The glacier being traversed by innumerable capillary fissures, and being in summer saturated with water in all its parts, it was natural to invoke the freezing action of the night to convert this water into ice, and by the amount of its expansion to urge the glacier onward in the direction of its greatest slope. In answer to this, it is sufficient to observe, in the first place, that during the height of summer the portions of those glaciers which move fastest are never reduced below the freezing point, and that, even in the most favorable cases of nocturnal radiation producing congelation at the surface, it cannot (by well-known laws of conduction) penetrate above a few inches into the interior of the glacier. Again, the ascertained laws of glacier-motion are (as will be immediately seen) entirely adverse to this theory, as it is always accelerated by hot weather and retarded by cold, yet does not cease even in the depths of winter.

It is singular how slow observers were to perceive the importance to the solution of the problem of glacier-motion of ascertaining with geometrical precision the amount of motion of the ice, not only from year to year, but from day to day, in summer and winter, whether constant or variable at the same point, whether continuous or by starts: if variable, on what circumstances it depended, and in what manner it was affected at different points of the length and breadth of a glacier.

This method of studying the question was taken up by Forbes. His observations were commenced on the Mer de Glace of Chamouni, in June 1842. Between the 26th and 27th of that month the motion of the ice opposite a point called the "Angle" was found, by means of a theodolite, to be 16.5 inches in twenty-six



hours; between the 27th and 28th, 17.4 inches in twenty-five and a half hours; and from 6 A.M. to 6 P.M. on the 28th the motion was 9.5 inches, or 17.5 inches in twenty-four hours; whilst the proportional motion during even an hour and a half was observed. No doubt could therefore remain that the motion of the ice is continuous and tolerably uniform—in short, that it does not move by jerks. He also ascertained about the same time that the motion of the ice is greatest toward the center of a glacier and slower at the sides, contrary to an opinion then maintained on high authority. He next found that the rate of motion varied at different points of the length of the same glacier, being on the whole greatest where the inclination of its surface is greatest. As the season advanced, he observed notable changes in the rate of motion of the same part of the ice, and connected it by a very striking direct relation with the temperature of the air. These facts were established during the summer of 1842, and promptly published. By means of occasional observations during the following winter and spring by his guide, Auguste Balmat of Chamouni, and by a more full comparison of the entire motion of a glacier for twelve months with its motion during the hot season of the year, another generally received error was rectified: the motion of the glacier continues even in winter, and has a very perceptible ratio to the summer motion. Last of all, it was found that the surface of a glacier moves faster than the ice nearer the bottom or bed.

These and some minor laws of motion, being undoubted expressions of the way in which glaciers move, were formulated by Forbes in an approximate theory: "A glacier is an imperfect fluid or a viscous body, which is urged down slopes of a certain inclination by the mutual pressure of its parts."

Any mechanical theory of glaciers must be more or less imperfect which does not explain the remarkable veined or ribboned structure of the ice, with its peculiar course through the interior of the glacier, as above described. According to Forbes the fundamental idea is that the veined or ribboned structure of the ice is the result of internal forces, by which one portion of ice is dragged past another in a manner so gradual as not necessarily to produce large fissures in the ice, and the consequent sliding of one detached part over another, but rather the effect of a general bruise over a considerable space of the yielding body. According to this view, the delicate veins seen in the glacier, often less than a quarter of an inch wide, have their course parallel to the direction of the sliding effort of one portion of the ice over another. Among other proofs of this fundamental conception that the veined structure is the external symbol of this forced internal motion of a body comparatively solid, Forbes cited a striking instance from the glacier of La Brenva, on the south side of Mont Blanc. In this case the ice of the glacier, forcibly pressed against the naked, rocky face of an opposing hill is turned into a new direction; and in thus shoving and squeezing past a prominence of rock, he observed developed in the ice a "veined structure" so beautiful that "it was impossible to resist the wish to carry off slabs, and to perpetuate it by hard specimens." This perfectly developed structure was visible opposite the promontory which held the glacier in check, and past which it struggled, leaving a portion of its ice completely embayed in a recess of the shore behind it. Starting from this point as an origin, the veined laminae extended backward and upward into the glacier, but did not spread laterally into the embayed ice. They could, however, be traced from the shore to some distance from the promontory into the icy mass. The direction of lamination exactly coincided with that in which the ice

must have moved if it was shoved past the promontory at all. That it did so move was made the subject of direct proof, by fixing two marks on the ice opposite the promontory, one on the nearer, the other on the farther side of the belt of ice which had the lamination best developed. The first mark was fifty feet from the shore, and moved at the rate of 4.9 inches daily; the other mark was 170 feet further off, and moved almost three times faster, or 14.2 inches daily. Throughout this breadth of 170 feet there was not a single longitudinal crevasse which might have facilitated the differential motion. A parallelogram of compact ice, only 170 feet wide, was therefore moving in such a manner that, while one of its sides advanced only a foot, the other advanced a yard. No solid body, at least no rigid solid body, can advance in such a manner; Forbes therefore concluded that glacier-ice is plastic, that the veined structure is unquestionably the result of the struggle between the rigidity of the ice and the quasi-fluid character of the motion impressed upon it, and that this follows, not only from the direction of the laminae, but from their becoming distinct exactly in proportion to their nearness to the point where the bruise is necessarily strongest. The subsequent experiments of Sorby on the cleavage structure of rocks proved that it has arisen as the result of intense lateral compression, and could be imitated in many artificial substances. Tyndall obtained it even in beeswax, the analogy between which and the veined structure of ice is very close.

Though Forbes termed his expression of the laws of glacier motion the "viscous" or "plastic theory," it was rather a statement of fact than an explanation of the physical processes concerned in the descent of glaciers. Against his views it was of course objected that ice is by its nature a brittle solid, and not sensibly possessed of any viscous or plastic quality. But he cogently replied that the qualities of solid bodies of vast size, and acted on by stupendous and long-continued forces, cannot be estimated from experiments on a small scale, especially if short and violent; that sealing-wax, pitch, and other similar bodies mold themselves, with time, to the surfaces on which they lie, even at atmospheric temperatures, and whilst they maintain, at the same time, the quality of excessive brittleness under a blow or a rapid change of form; that even ice does not pass at once, and *per saltum*, from the solid to the liquid state, but absorbs its latent heat throughout a certain small range of temperature (between  $28^{\circ}.4$  and  $32^{\circ}$  of Fahrenheit), which is precisely that to which the ice of glaciers is actually exposed; that, after all, a glacier is not a crystalline solid, like ice, tranquilly frozen in a mold, but possesses a peculiar fissured and laminated structure, through which water enters (at least for a great part of the year) into its intrinsic composition. He insisted that the quasi-fluid or viscous motion of the ice of glaciers is not a theory but a fact. A substance which is seen to pour itself out of a large basin through a narrow outlet without losing its continuity; the different parts of which, from top to bottom, and from side to center, possess distinct though related velocities; which moves over slopes inconsistent with the friction between its surface and the ground on which it rests; which surmounts obstacles, and even if cleft into two streams by a projecting rock, instead of being thereby anchored as a solid would necessarily be, reunites its streams below, and retains no trace of the fissure, leaving the rock an islet in the icy flood,—a substance which moves in such a fashion cannot, Forbes maintained, in any true sense of the word, be termed a rigid solid, but must be granted to be ductile, viscous, plastic, or semifluid, or to possess qualities represented by any of these terms



which we may choose to adopt as least shocking to our conception of the littleness of ice.

The problem of the cause of glacier-motion cannot yet be considered to be satisfactorily solved.

GLADBACH, usually called BERGISCH-GLADBACH, a town of Prussia, circle of Mülheim, government district of Cologne, is situated eight miles northeast of the latter town.

GLADBACH, or MÖNCHEN-GLADBACH, a flourishing and rapidly increasing manufacturing town of Rhenish Prussia, capital of a circle in the government district of Düsseldorf, is situated sixteen miles west-southwest of the town of that name.

GLADIATORS, professional combatants with men or beasts in the Roman arena. That this form of spectacle, which is almost peculiar to Rome and the Roman provinces, was originally borrowed from Etruria is shown by various indications. On an Etruscan tomb discovered at Tarquinii there is a representation of gladiatorial games; the slaves employed to carry off the dead bodies from the arena wore masks representing the Etruscan Charon; and we learn from Isidore of Seville that the name for a trainer of gladiators, *lanista*, is an Etruscan word meaning butcher or executioner. These games are evidently a survival of the practice of immolating slaves and prisoners on the tomb of illustrious chieftains, a practice recorded in Greek, Roman, and Scandinavian legends, and traceable even as late as this century to the Indian suttee. Even at Rome they were for a long time confined to funerals, and hence the older name for gladiators was *bustuarii*; but in the later days of the republic their original significance was forgotten, and they formed as indispensable a part of the public amusements as the theater or the circus.

The first gladiators are said, on the authority of Valerius Maximus, to have been exhibited at Rome in the Forum Boarium 264 B.C., by Marcus and Decimus Brutus, at the funeral of their father. On this occasion only three pairs fought, but the taste for these games spread rapidly, and the number of combatants grew apace. In 174 B.C. Titus Flamininus celebrated his father's obsequies by a three days' fight, in which seventy-four gladiators took part. Julius Cæsar engaged such extravagant numbers for his ædileship, that his political opponents took fright, and carried a decree of the senate imposing a certain limit of numbers; but, notwithstanding this restriction, he was able to exhibit no less than 300 couples. During the latter days of the republic the gladiators were a constant element of danger to the public peace. The more turbulent spirits among the nobility had each his band of gladiators to act as a body guard, and the armed troops of Clodius, Milo and Catiline played the same part in Roman history as the armed retainers of the feudal barons or the condottieri of the Italian republics.

Under the empire, notwithstanding sumptuary enactments, the passion for the arena steadily increased. Augustus, indeed, limited the shows to two a year, and forbade a prætor to exhibit more than 120 gladiators, yet allusions in Horace and Persius show that 100 pairs was the fashionable number for private entertainments; and in the Marmor Ancyranum the emperor states that more than 10,000 men had fought during his reign. The imbecile Claudius was devoted to this pastime, and would sit from morning till night in his chair of state, descending now and then to the arena to coax or force the reluctant gladiators to resume their bloody work. Under Nero senators, and even well-born women, appeared as combatants; and Juvenal has handed down to eternal infamy the descendant of the Gracchi that appeared without disguise as a *retiarius*, and begged his life from the *secutor*, who blushed to conquer one so noble

and so vile. Titus, whom his countrymen surnamed the Clement, ordered a show which lasted 100 days; and Trajan, in celebration of his triumph over Decebalus, exhibited 5,000 pairs of gladiators. Domitian instituted *venationes* by torchlight, and at the Saturnalia of 90 A.D. arranged a battle between dwarfs and women. Even as late as 200 A.D. an edict was passed forbidding women to fight. How widely the taste for these sanguinary spectacles extended throughout the Roman provinces is attested by monuments, inscriptions, and the remains of vast amphitheaters. From Britain to Syria there was not a town of any size that could not boast its arena and annual games.

Gladiators were commonly drawn either from prisoners of war, or slaves, or criminals condemned to death. Thus in the first class we read of tattooed Britons in their war chariots, Thracians with their peculiar bucklers and scimitars, Moors from the villages round Atlas, and negroes from central Africa, exhibited in the Colosseum. Down to the time of the empire only greater malefactors, such as brigands and incendiaries, were condemned to the arena; but by Caligula, Claudius, and Nero this punishment was extended to minor offenses, such as fraud and peculation, in order to supply the growing demand for victims. For the first century of the empire it was lawful for masters to sell their slaves as gladiators, but this was forbidden by Hadrian and Marcus Aurelius. Besides these three regular classes, the ranks were recruited by a considerable number of freedmen and Roman citizens who had squandered their estates, and voluntarily took the *auctoramentum gladiatorium*, by which for a stated time they bound themselves to the *lanista*. Even men of birth and fortune not seldom entered the lists, either for the pure love of fighting, or to gratify the whim of some dissolute emperor; and one emperor, Commodus, actually appeared in person in the arena.

Gladiators were trained in schools (*ludi*) owned either by the state or by private citizens; and though the trade of a *lanista* was considered disgraceful, to own gladiators and let them out for hire was reckoned a legitimate branch of commerce. Thus Cicero, in his letters to Atticus, congratulates his friend on the good bargain he had made in purchasing a band, and urges that he might easily recoup himself by consenting to let them out twice. Men recruited mainly from slaves and criminals, whose lives hung on a thread, must have been more dangerous characters than modern galley slaves or convicts; and, though highly fed and carefully tended, they were of necessity subject to an iron discipline. In the school of gladiators discovered at Pompeii, of the sixty-three skeletons buried in the cells many were in irons. But hard as was the gladiator's lot, so hard that special precautions had to be taken to prevent suicide, it had its consolations. A successful gladiator enjoyed far greater fame than any modern prize-fighter or athlete. He was presented with broad pieces, chains, and jeweled helmets, such as may be seen in the museum at Naples; poets like Martial sang his prowess; his portrait was multiplied on vases, lamps, and gems; and high-born ladies contended for his favors. Mixed, too, with the lowest dregs of the city, there must have been many noble barbarians condemned to the vile trade by the hard fate of war. There are few finer characters in Roman history than the Thracian Spartacus, who, escaping with seventy of his comrades from the school of Lentulus at Capua, for three years defied the legions of Rome; and after Antony's defeat at Actium, the only part of his army that remained faithful to his cause were the gladiators whom he had enrolled at Cyzicus to grace his anticipated victory.



There were various classes of gladiators, distinguished by their arms or mode of fighting. The Samnites fought with the national weapons—a large, oblong shield, a vizard, a plumed helmet, and a short sword. The Thracians had a small, round buckler and a dagger carved like a scythe; they were generally pitted against the Mirmidones, so called from the fish (*μορμύλος*) which served as the crest of their helmet. In like manner the Retiarius was matched with the Secutor: the former had nothing on but a short tunic or apron, and sought to entangle his pursuer, who was fully armed, with the cast-net (*jeculum*) that he carried in his right hand; and if successful, he dispatched him with the trident (*tridens*, *fusina*) that he carried in his left. We may also mention the Andabatae, who wore helmets with closed vizors; the Dimachæri of the later empire; the Essedarii, who fought from chariots like the ancient Britons; the Hoplomachi, armed like a Greek hoplite; and the Laqueatores, who tried to lasso their antagonists.

**GLADIOLUS**, a genus of monocotyledonous or endogenous plants, belonging to the natural order *Iridaceæ* and representative of the tribe *Gladioleæ*, a group of bulbous plants in which the perianth is irregular, and the stamens unilateral and arched, with the filaments free. It belongs to a subdivision of the *Gladioleæ*, in which the segments of the limb of the perianth are very unequal, and is specially distinguished by having the perianth tube curved, funnel-shaped, and widening upward, and by the segments equaling or exceeding the tube in length. About ninety species are described, of which number upward of fifty are from the Cape; and the rest from tropical Africa, the central and southern regions of Europe, Persia, the Caucasus, and the Levant. One species, *G. illyricus*, is found apparently wild in England, in the New Forest, Hampshire. Some of the species have been cultivated for a long period in our flower-gardens, where both the introduced species and the modern varieties bred from them are very ornamental and popular. The stately habit and rich glowing colors of the modern gladioli render them exceedingly valuable as decorative plants during the late summer months. They are, moreover, very desirable and useful flowers for cutting for the purpose of room decoration, for while the blossoms themselves last fresh for some days, the undeveloped buds open in succession, if the stalks are kept in water, so that a cut spike will go on blooming for a considerable period.

**GLAMORGAN** (Welsh, *Gwlad Morgan*), a maritime county of South Wales, bounded on the north by Brecknock and Carmarthen, on the west by Carmarthen and its bay, on the south by the Bristol Channel, and on the east by Monmouth, the boundary line of which is the Rhymney. Its greatest length from east to west is about fifty-three miles, its greatest breadth from north to south about twenty-nine; its coast-line is about sixty miles, and its area 516,959 acres.

Glamorgan, with the exception of some flat tracts on the borders of the Bristol Channel, consists of a succession of hills and valleys, the country inland growing more and more mountainous, after a broad tract of plain on the south coast, until on the borders of Brecknock its surface is a sea of hills. None of the mountains rise to a great height, the most lofty, Mynydd Llangeinor, being but 1,859 feet, and the escarpment of Craig y Llyn about the same height or a little higher. Yet their bold forms add grandeur to the scenery of the county, and their lower slopes are clothed with picturesque though not large timber.

The valleys of Glamorgan have been long famous for great beauty of scenery. The vale of Glamorgan, some eight miles in breadth, has been truly called the "Gar-

den of Wales," and its climate is so mild that myrtles and other tender plants flourish in the open air. The vale of Neath is known to tourists as the waterfall district of South Wales, the finest falls being betwixt Hirwain and Neath, near the Vale of Neath Railway, viz.: Cilhepstè fall, the three Clwngwyns, the falls of the Pyrddin, Scwd-Einon Gam, Scwd-Gladys, and Scwd Hen Rhydd on the Llech, with Melincourt and Abergarwedd still nearer Neath. The highest of these falls are above eighty feet. Swansea valley has also fine scenery. Other valleys are those of the Rhymney, the Taff, the Rhondda, and the Llwchwr, the first two giving their names to important railways.

The rivers of Glamorgan are not large. The chief are the Rhymney, forming the county's eastern boundary; the Ogwr or Ogmere, which flows into the Bristol Channel near Porth-Cawl harbor; the Taff, which rises in the Brecon Beacon, flows southward through the county, and forms the important harbor of Cardiff; the Neath and Tawe, flowing south into Swansea Bay; and the Llwchwr, which is the boundary of the county on the west, and, falling into Carmarthen Bay, forms the estuary of the Burry river.

The chief geological feature of Glamorgan is the Coal-measures, which are of the greatest thickness near Neath, but extend nearly over the whole country, and are bounded by a narrow band of Millstone Grit and Mountain Limestone, nearly coincident with the county boundary on the north. In the extreme south and southwest the Devonian, Magnesian Limestone, and the lias show themselves.

The climate is mild, and the plains on the coast as well as inland are very fertile. The soil is a deep rich loam, improved by lime. Agriculture is as yet not so forward as it might be with such a soil and climate; but the farms are seldom large, and the buildings are not suited to high farming. The crops chiefly raised are wheat, beans, pease, oats, barley, vetches, turnips, and potatoes. The cattle are of good useful breeds; and good sheep and ponies are reared. Population, 550,000.

**GLANDERS**, or **EQUINIA**, a specific infectious disease to which certain animals, chiefly those possessing an undivided hoof, are liable, and which is communicable from them to man. The term farcy is also employed to designate a variety of this affection, but there is no pathological distinction between the two. The disease as it affects animals belongs to the subject of Veterinary Medicine.

Glanders is happily a rare form of disease in man, there being evidently less affinity for its development in the human subject than in the equine species. It occurs chiefly among those who from their occupation are frequently in contact with horses, such as grooms, coachmen; cavalry soldiers, veterinary surgeons, etc., and seems always produced either by direct inoculation of the virus from a diseased animal into the broken skin, or by the respiration of air containing the poison. It is said to have occasionally been transmitted from man to man, but such an occurrence is extremely rare.

A period of incubation, lasting from three to five days, generally follows the introduction of the virus into the system. This period, however, appears sometimes to be of much longer duration, especially where there has been no direct inoculation of the poison. The first symptoms are a general feeling of illness, accompanied with pains in the limbs and joints resembling those of acute rheumatism. If the disease has been introduced by means of an abraded surface, pain is felt at that point, and inflammatory swelling takes place there, and extends along the neighboring lymphatics. An ulcer is formed at the point of inoculation which discharges an offensive ichor, and blebs appear in the



inflamed skin, along with diffuse abscesses, as in phlegmonous erysipelas. Sometimes the disease stops short with these local manifestations, but more commonly goes on rapidly accompanied with symptoms of grave constitutional disturbance. Over the whole surface of the body there appear numerous red spots or pustules, which break and discharge a thick mucous or sanguineous fluid. Besides these there are larger swellings lying deeper in the subcutaneous tissue, which at first are extremely hard and painful, and to which the term farcy "buds" or "buttons" is applied. These ultimately open and become extensive sloughing ulcers.

The general constitutional symptoms are exceedingly severe, and advance with great rapidity, the patient passing into a state of extreme prostration. In the acute form of the disease recovery rarely if ever occurs, and the case generally terminates fatally in a period varying from two or three days to as many weeks.

GLANDS are divided by anatomists into two great classes—viz., true secreting glands and ductless glands. The first class constitute special organs, which are destined for the production of the chief secretions; as, for example, the lachrymal, mammary, and salivary glands, the liver, pancreas, kidneys, etc., while the suprarenal capsules, the spleen, the thymus, and the thyroid belong to the second class. An ordinary secreting gland consists of an aggregation of follicles, all of which open into a common duct, by which the glandular product is discharged. The follicles are contained in the interior cells, which are the active agents in the secreting process, while their exterior is surrounded by a net-work of capillaries, from whose contents the materials of secretion are extracted. The simplest form of a gland is the inversion of the surface of a secreting membrane into follicles, which discharge their contents upon it by separate mouths. The articolata (for example, insects) present glandular structures which can be unraveled much easier than the glands of vertebrate animals; and the forms, in all of which a large amount of secreting surface is presented in comparatively little space, are often very graceful. The mammary gland, which is a structure of considerable complexity in the higher mammals, presents a very simple arrangement in the lowest type of this class, the ornithorhynchus, being merely a cluster of cæcal follicles, each of which discharges its contents by its own orifice.

GLANDS, DISEASES OF. The lymphatic glands are subject to enlargement from acute inflammation and abscess, usually in consequence of irritation of the part from which their lymphatics spring, as in the case of scarlet fever, in which the glands of the throat are affected; in gonorrhœa, the glands of the groin, etc. The treatment of such abscesses belongs to the ordinary principles of surgery. A much more troublesome affection of the glands is the slow, comparatively painless, at first dense solid swelling which they undergo in scrofula, which tends slowly, if at all, to suppuration, and sometimes remains for years.

GLANVIL, GLANVILL, or GLANVILLE, RANULPH DE (died 1190), the oldest writer on English jurisprudence and chief justiciary of England in the reign of Henry II., was born at Stratford in Suffolk, but in what year is unknown.

GLANVILL, or GLANVIL, JOSEPH, was born at Plymouth in 1636, and was educated at Oxford university, where he graduated as M.A. in 1658. In 1666 he obtained the cure of Abbey Church at Bath; in 1678 he became probandary of the church of Worcester, and acted as chaplain in ordinary to Charles II. He died at Bath, November 16, 1680, in the forty-fourth year of his age. Glanvill's first work, *The Vanity of Dogmatizing, or Confidence in Opinions, manifested in a Dis-*

*course of the Shortness and Uncertainty of our Knowledge, and its Causes, with Reflexions on Peripateticism, and an Apology for Philosophy*, 1661, is interesting as showing one special direction in which the new method of the Cartesian philosophy might be developed. It is singular enough that Glanvill, who had not only shown, but even exaggerated, the infirmity of human reason, himself paid a strange tribute to its weakness; for, after having combated scientific dogmatism, he not only yielded to vulgar superstitions, but actually endeavored to accredit them both in his *Scepsis Scientifica*, 1665, and in his *Philosophical Considerations Concerning the Existence of Sorcerers and Sorcery*.

GLARUS, or GLARIS, a canton of Switzerland, is bounded on the north and northeast by St. Gall, on the east and south by the Grisons, and on the west by Uri and Schwyz. Its area is 266 or 267 square miles, its greatest length about thirty-three miles, and its greatest breadth about sixteen. Population, 38,000.

GLARUS, the capital of the canton, is a flourishing little town on the left bank of the Linth, about 1,495 feet above the sea-level. Its environment is a remarkable one: to the south the Glärnisch rises 6,153 feet; to the northwest the Wiggis, 6,033, and to the east, the Schild, 6,010. The fire of 1861 devastated the greater part of the town, destroying its Gothic church of the tenth century, the casino, the government houses, and all its principal buildings; 2,000 of the inhabitants were rendered houseless, and property to the value of 8,000,000 francs was destroyed. Contributions, however, were sent in from far and near to the amount of 2,754,606 francs, the federal authorities of Switzerland voted a loan of 1,000,000 at two per cent., and the canton furnished a subsidy at 3 per cent.; the town was rapidly rebuilt in a substantial and regular style, and the public edifices restored. Population (1890), 5,000.

GLAS, JOHN, the founder of the sect generally known as Glassites or Sandemanians, was born at Auchtermuchty, Fife, on October 5, 1695. He died in 1773.

GLASSITES (Sandemanians). The Glassite denomination, which has never been a numerous one, is distinguished by a number of peculiarities alike in doctrine, discipline, and worship. One of the most characteristic of its tenets is that which owes its elaboration to Robert Sandeman (1718-1771), the son-in-law of Glas, from whom is derived the name of Sandemanians, by which the sect is principally known in England and America. In a series of letters (1757) to Hervey, the author of *Theron and Aspasio*, he maintained that justifying faith is a simple assent to the divine testimony concerning Jesus Christ, differing no way in its character from belief in any ordinary human testimony. No distinctive theological system, however, has as yet been elaborated from this point of view. In their practice the Glassite churches aim at a strict conformity with the primitive type of Christianity as that is understood by them. Each congregation has a plurality of elders, pastors, or bishops, who are chosen according to what are believed to be the instructions of Paul, without regard to previous education or present occupation, and who enjoy a perfect equality in office. To have been married a second time disqualifies for ordination, or for continued tenure of the office of bishop. In all the action of the church unanimity is considered to be necessary; and if any member differ in opinion from the rest, he must either surrender his judgment to that of the church or be shut out from its communion. To join in prayer with any one who is not a member of the denomination is regarded as unlawful, and even to eat or drink with one who has been excommunicated is held to be a heinous sin. The Lord's



Supper is observed weekly; and between forenoon and afternoon service every Sunday a love feast, at which it is incumbent on every member to be present, is held after the manner of the primitive Christians. Mutual exhortation is practiced at all the meetings for divine service, it being lawful for any member who possesses the gift to speak. The practice of washing one another's feet was at one time observed; and it is still customary for each brother and sister to receive new members, on admission, with a holy kiss. "Things strangled" and "blood" are rigorously abstained from; the lot is regarded as sacred; the accumulation of wealth is regarded as unscriptural and improper, and each member considers his property as liable to be called for at any time to meet the wants of the poor and the necessities of the church. The number of adherents at present belonging to the denomination is probably a little under 2,000.

GLASER, CHRISTOPHER, one of the minor chemists of the seventeenth century, concerning the details of whose life very little is known. A salt (the normal sulphate of potassium) which he showed how to prepare, and the medicinal properties of which he pointed out, was named *Glaseri sal polychrestum*, or salt of many uses. The native sulphate is still known as *glaserite*.

GLASGOW, the most populous city in Great Britain next to London, is situated on the banks of the river Clyde, in the Scottish county of Lanarkshire, about twenty miles above Greenock, where the river spreads out into a noble estuary, with branching lochs running deep into the heart of the Western Highlands. It is within ten hours' railway run (405½ miles) of the metropolis, and an hour and a quarter (forty-five miles) of Edinburgh. The extreme breadth of the city is about three and a quarter miles from north to south, and the extreme length five miles from east to west. The circumference is about ten miles; and the area embraced within the municipal boundaries is now 6,111½ acres. The population amounts to 600,000. The smaller burghs which have sprung up round Glasgow within the last twenty or thirty years have kept pace with the mother burgh in development, and now contain a population among them of about 170,000. As these burghs are essentially parts of Glasgow, having been formed by the overflow of its population, they ought to be added to the city in any estimate of its size and importance. The population of Glasgow, taking this basis, is therefore close to 770,000. The increase of the population during the present century has been greater perhaps than that of any other city or town of the Old World.

Unlike the "gray metropolis of the north," Glasgow shows rather poorly in the history of Scotland. Its own real history—the history of its commerce and industries—can hardly be dated farther back than the beginning of the last century, when the union of England and Scotland roused into extraordinary activity the trading spirit of its inhabitants. And yet Glasgow is an old city. Its foundations were laid when the half-mythical Kentigern sat down by the banks of the Molendinar, to teach the rough Celts of Strathclyde the truths of Christianity. It was about the middle of the sixth century that this apostle of truth made his appearance in the west of Scotland, and built his little wooden church on the spot upon which some centuries later his successors reared the noble cathedral which still stands in perfect beauty. One can only guess that the inhabitants of this portion of Strathclyde gathered round the abode and church of St. Mungo, and that as the site was pleasant, and the Molendinar and the Clyde supplied ample store of trout and salmon, the village, under the fostering care of the monks, grew slowly until it became a place of importance. Of that growth, however, nothing

is really known till we reach the twelfth century. In the year 1,115, an investigation was ordered by David, then prince of Cumbria, of the lands and churches belonging to the bishopric of Glasgow, and from the deed which still exists it is evident that at that time a cathedral had been endowed. A few years later David succeeded to the Scottish throne on the death of his brother, Alexander I., and among the many endowments he made for religious purposes, we find that he gave to the see of Glasgow the lands of Partick, besides restoring many possessions of which it had been despoiled. Jocelyn was bishop of Glasgow for a long period, and is memorable for the efforts he made to rebuild the cathedral which had been destroyed by fire. He collected funds with so much success that, in 1,197, the new structure was sufficiently advanced to be dedicated. The next bishops of note were Bodington and Wisheart. The former carried on the building work of Jocelyn; the latter was a patriotic Scot who resisted the conquering army of Edward I., and was among the first to join in the revolt of Wallace, and to receive Robert Bruce when he was proscribed by Edward and lay under the ban of the church for the murder of the Red Comyn. Wisheart was a prisoner from the year 1306 to the battle of Bannockburn, and he lived to see Bruce firmly established upon the Scottish throne. Bishop Rae deserves mention for having built a stone bridge over the Clyde (1345). Bishop Turnbull was the greatest benefactor the city had till then found; for he was the founder of Glasgow university (1450). He also received a charter from James II. in 1420, erecting the town and the lands of the bishops into a regality. The most notable fact after the Reformation in the history of the Glasgow Church was the Assembly of 1638, which was held in the city, when Episcopacy was finally abjured, the Solemn League and Covenant accepted, and its signature made binding upon all who claimed the ordinances of the Presbyterian Church. The fact that the craftsmen were zealous for the preservation of their fine old cathedral, indicates probably, that the Reformation doctrines were not received so enthusiastically in Glasgow as in many other places in Scotland; but they took deep root latterly, and in the struggles for religious and civil liberty in the seventeenth century the inhabitants were among the foremost to assist and endure in the good cause.

Glasgow owed its erection into a burgh to its ecclesiastic lords. One of these obtained a royal charter from William the Lion in the last quarter of the twelfth century (between the years 1175 and 1178), which made the town a burgh, and gave it a market with freedom and customs. Another charter, it is supposed, was granted in 1190, and, according to a deed dated 1268, the town was governed by a provost and bailies, and had courts of justice for settling disputes among the inhabitants. There are no records, however, till almost quite recent times.

Glasgow was not aware of the vast benefits that were conferred upon her by the union of England and Scotland in 1707. The measure was stoutly resisted by the inhabitants, and its proclamation nearly led to a riot; but the merchants very soon saw that, by the water highway which flowed through the town, they could have access to the profitable trade that had been opened up in North America. Glasgow's situation for the western foreign traffic was the best in Scotland, and inferior to none of the great towns of England. The Treaty of Union put every Scottish port, so far as trade was concerned, on an equal footing with the English ports; and there was no reason why Glasgow should not share in the wealth which, in ever-increasing amount, was yearly coming across the Atlantic. When it became



possible for Glasgow merchants to enter into competition with the merchants of Bristol, companies were formed to carry on the trade with the North American colonies, and a large trade was soon established. Ships were chartered, and, as wealth poured in, were built, and sailed regularly for Virginia, Maryland and Carolina, taking out goods in barter for cargoes of tobacco. In 1760 Glasgow had completely rivaled Bristol in the tobacco trade, and in 1772 its importations were more than half of the entire quantity brought into the United Kingdom. The Virginian trade being exceedingly lucrative, Glasgow flourished under it. The town rapidly extended westward, handsome mansion-houses for the "tobacco-lords" were erected, and the austerity of manners which had come down from the covenanting days was somewhat relaxed. The money made by tobacco found its way into other branches of commerce and stimulated new industries. The tobacco trade, however, received a crushing blow at the outbreak of the American War—a blow from which it never wholly recovered, for, after the war was over, and the thirteen colonies had become the United States of North America, Glasgow was engaged in other commercial enterprises. The distress in the city was keen during the first years of the war, and Glasgow capitalists turned their attention to the West Indies and the cultivation of the sugar cane. The manufacture of cotton goods was introduced also about this time, and proved a new source of wealth and prosperity. Calico printing, which was soon to develop into a great industry, employing thousands of persons, was started at Pollokshaws in 1742; the inkle loom was set up in 1732; glass-making was established in a feeble way in 1730; and the brewing of beer and ale on a large scale was attempted with success. In 1764 James Watt perfected his first model of a steam engine in a small workshop, which had been granted to him by the senatus of the university, within the college walls. From the Treaty of Union down to the end of the eighteenth century, the progress of the city had been remarkable. In 1708 the population was estimated to be upward of 12,000; at the end of the century it was close upon 80,000.

The river has been the fruitful source of the city's greatness. As the accessibility of the water-way became greater year by year, so the commerce and the industries of the city developed, and the material wealth increased. Glasgow, too, is fortunate in being the center of an enormous coal and iron field, in the working of which she has greatly benefited. Her industries, now very numerous, are referred to in detail below. They embrace almost every species of manufacture to be found in Great Britain; and this variety is probably the reason for the all but uninterrupted prosperity of the city, for it is rare that every department of manufacture and commerce is dull at the same time.

The affairs of Glasgow are managed by a corporation consisting of forty-eight representatives of the sixteen wards into which the city is municipally divided, and by one representative from the Trades' and one from the Merchants' House. The lord provost is the head of the corporation, and is assisted in his executive functions by ten bailies.

In 1866 Glasgow was one of the least healthy towns in Great Britain; in 1877 it was nearly as healthy as London. In 1866 the annual death rate was 29.6 per thousand, and continued slightly rising or falling till 1875, when there was a fall to 28.7. This was the year in which the work of the improvement trustees began to tell. In 1876 the death rate was 25.2 per thousand, in 1877 it was 24.9, and in 1878 it was 25.0. The improvement scheme has done good otherwise in directing attention to sanitary questions of all kinds. There is

now in Glasgow a public department of health, at the head of which there is a most efficient medical officer, and provision has been made for the isolation of contagious diseases immediately on their breaking out. Great attention is paid to cleansing the city, and fever epidemics, which not long ago were seldom absent, are now very rare, and hardly ever assume large proportions. Crime has almost diminished as one of the results of the city improvements, and its detection is much surer.

There are three fine bridges over the river within the municipal boundaries, and two iron suspension bridges. One railway bridge was erected a few years ago by the City Union Railway Company, and another by the Caledonia Railway Company was recently completed. All the bridges are free. Glasgow is the center of a vast railway system, the Caledonian and Glasgow & South-Western Railways having their termini in the city; these work with the great English lines, the Midland and the London & North-Western Companies.

The public statues in Glasgow are not numerous, though several of them are very fine. Most of them are in George Square.

Of the educational institutions of Glasgow precedence must be given to the university. During the period which intervened between 1577 and 1688 the university underwent many changes; but in the year 1693, each of the Scottish colleges having received a grant of £300 per annum out of the bishops' rents, the Glasgow institution again revived; and having received other public and private gifts, its progress has been since uninterrupted. The academic body of the university consists of the chancellor, the lord rector, the dean of faculty, the principal and vice-chancellor, and the professors. The whole business of the university is transacted in three distinct courts, viz., the senatus, the faculty, and the comitia. There are many bursaries connected with the college, the most important being those bequeathed by Mr. Snell, by Mrs. Black, the widow of the late minister of the Barony church, and by Mr. Orr-Ewing, M.P. for Dumbartonshire. The college buildings in High Street were principally erected in 1593 and 1658. The spire, which was 153 feet in height, possessed a lightning conductor which was reared under the auspices of Franklin in 1772.

Anderson's College, formerly called Anderson's (or the Andersonian) University, was founded by John Anderson, professor of natural philosophy in the university of Glasgow in 1795, and endowed by him with valuable philosophical apparatus, a museum, and a library. It is governed by eighty-one trustees, and its object is to bring literary and scientific education within the reach of the mass of the community.

The libraries open to the public are Stirling's public library, a large collection of literature, and famous for its tracts of the sixteenth and seventeenth centuries, and the Mitchell public library, established a few years ago by the munificence of a citizen of Glasgow, who left about £80,000 for the purpose.

The drama has always been tolerably well patronized in Glasgow, which now contains some half-dozen theaters.

The Chamber of Commerce was instituted in 1783, for the purpose of encouraging and protecting trade, and keeping a watchful eye on whatever might be supposed to affect the commercial interests of Glasgow and its neighborhood. There are eight banks and branch banks in the city, two of them being properly Glasgow institutions; they are all joint-stock companies.

The city is specially well provided with public parks, although not more than a quarter of a century has elapsed since it possessed only one—Glasgow Green.



Glasgow has become almost exclusively a commercial city within the last half century. As wealth increased culture also increased, though more slowly. The university has always been the center of intelligence in the city, and many professors have been conspicuous for their devotion to the applications of pure science to the development of the arts and manufactures. Of the great names connected with this institution it may suffice to mention Baillie, whose letters on the troubles of the seventeenth century, recovered by the late Dr. Laing, of Edinburgh, added considerably to our knowledge of that period, and Professors Adam Smith and Thomas Reid. James Watt, though not a member of the university, was generously protected by it when the burgesses of Glasgow refused to allow him to open shop within the jurisdiction of the trades house and magistrates of the city.

GLASS. The art of glass-making, unlike that of pottery, would appear not to have been discovered and practiced by different nations independently, but to have gradually spread from a single center. No trace of it was observed among the inhabitants of America at the time when the continent was discovered, although considerable progress in arts had been made by some among them, *e.g.*, the Mexicans and Peruvians; but the steps by which it reached China may be indicated with much probability. The credit of the invention was given by the ancients to the Phœnicians, as is shown by the well-known story of the fortuitous discovery by Phœnician merchants, who rested their cooking pots on blocks of natron, and found glass produced by the union under heat of the alkali and the sand of the shore. A glassy mass may, however, be produced in the smelting of many metallic ores, silica being present, while the fuel supplies the alkali; or by the combustion of great masses of reeds or straw, in which the elements of glass are present,—lumps of coarse, imperfect glass being often found on the spot where a stack of wheat has been burned. Now the Egyptians practiced metallurgic operations from a very early period, and vast heaps of straw are, and no doubt have been from the earliest times, accumulated in that country, and probably not infrequently set on fire. The adoption of glass as a substance capable of being made subservient to the use of mankind may therefore be due to the intelligence of some one who noticed its fortuitous production there. Be this as it may, by far the earliest examples of glass existing of which the dates are attested by inscriptions are of Egyptian origin.

The Phœnicians probably derived their knowledge of the art from Egypt; whether this be so or not, they undoubtedly practiced it from a very early period and to a very large extent. Probably much the same processes were employed in Phœnicia and Egypt during some centuries before the Christian era, as they certainly were in Phœnicia, Egypt, and Rome for some centuries after. It seems probable that the earliest products of the industry of Phœnicia in the art of glass-making are the colored beads which have been found in almost all parts of Europe, in India and other parts of Asia, and in Africa.

The Greeks, excellent in the ceramic art, do not appear to have cultivated the art of glass-making at a very early period; but it was probably made in many places on the shores of the Mediterranean for some centuries before the Christian era. At Mycenæ many disks of opaque vitreous pastes were found by Schliemann. and very similar objects at Ialysus in Rhodes; but it is not certain that these may not have been brought from Egypt, where very similar objects have been found, or whether they ought not to be attributed to Greek or to Phœnician artisans. At Camirus in Rhodes, however,

many vessels of glass of very elegant forms have been discovered, which were probably made in the island.

In Etruscan tombs in Italy are also found glass vessels of peculiar character; these are small bowls resembling in form the half of an egg; they are usually of the variety of glass which is called "madrepore," the ground green and transparent, the stars yellow, while patches of color of gold and of filigree glass are sometimes interspersed.

In the first centuries of our era the art of glass-making was developed at Rome and other cities under Roman rule in a most remarkable manner, and it reached a point of excellence which in some respects has never been excelled or even perhaps equaled.

The invention and ingenuity employed by the Roman artisans in producing variety in glass vessels are most remarkable; almost every means of decoration appears to have been tried, and many methods of manipulating glass, which have been considered inventions, have in reality been anticipated by the glass-workers of the period under consideration.

The Romans had at their command, of transparent colors, blue, green, purple or amethystine, amber, brown and rose; of opaque colors, white, black, red, blue, yellow, green and orange. There are many shades of the former as well as of the latter, particularly of transparent blue, and of opaque blue, yellow and green. Of opaque colors many varieties appear to be due to the mixture of one color with another.

These combinations of color were effected in two ways: first, by glasses of two or more colors being combined so as to traverse the entire substance of the object; and, secondly, by the superposition of the one color on the other.

To the former class belong all those termed mosaic and mille fiori, where the process of manufacture was the preliminary union, by heat, of threads of glass into a rod, which, when cut transversely, exhibited the same pattern in every section. Such rods were placed together side by side, and united by heat into a mass which was then formed into cups or other vessels.

The art of glass-making no doubt, like all other art, deteriorated during the decline of the Roman empire, but it is probable that it continued to be practiced, though with constantly decreasing skill, not only in Rome but in the provinces.

Some of the Roman artificers in glass no doubt emigrated to Constantinople, and it is certain that the art was practiced there to a very great extent during the Middle Ages. One of the gates near the port took its name from the adjacent glass-houses.

We have in the work of the monk Theophilus, and in the probably earlier work of Eraclius, about the eleventh century, instructions as to the art of glass-making in general, and then as to that of producing colored, gilt, and enameled vessels, which these writers speak of as being practiced by the Greeks. But we look almost in vain for existing specimens of such works.

Probably at Alexandria, one of the great seats of glass-making, the art survived the conquest of Egypt by the Saracens, for a glass disk serving as a weight has been met with in Egypt bearing the date ninety-six of the Hegira, corresponding with 715 A.D. Numerous later examples leave no doubt that the manufacture of glass continued to exist in Egypt, though perhaps in a languishing condition.

Pliny states that no glass was to be compared to the Indian, and gives as a reason that it was made from broken crystal; and in another passage he says that the Troglodytes brought to Ocelis (Ghella near Bab-el-Mandeb) objects of glass. We have, however, very little knowledge of Indian glass of any considerable antiquity.



# CLASS.

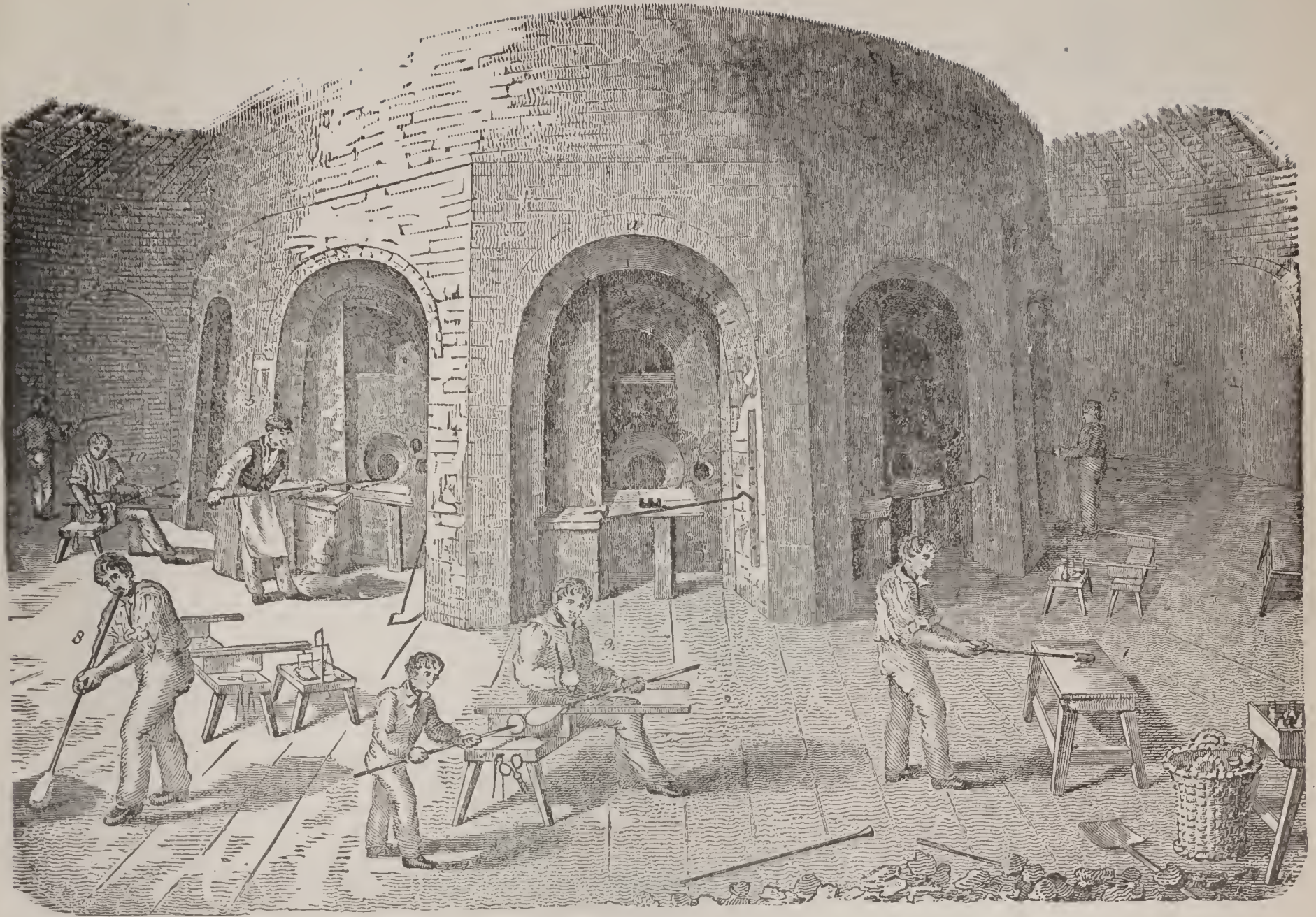


*Fig. 1.*

FLINT-GLASS MANUFACTORY.

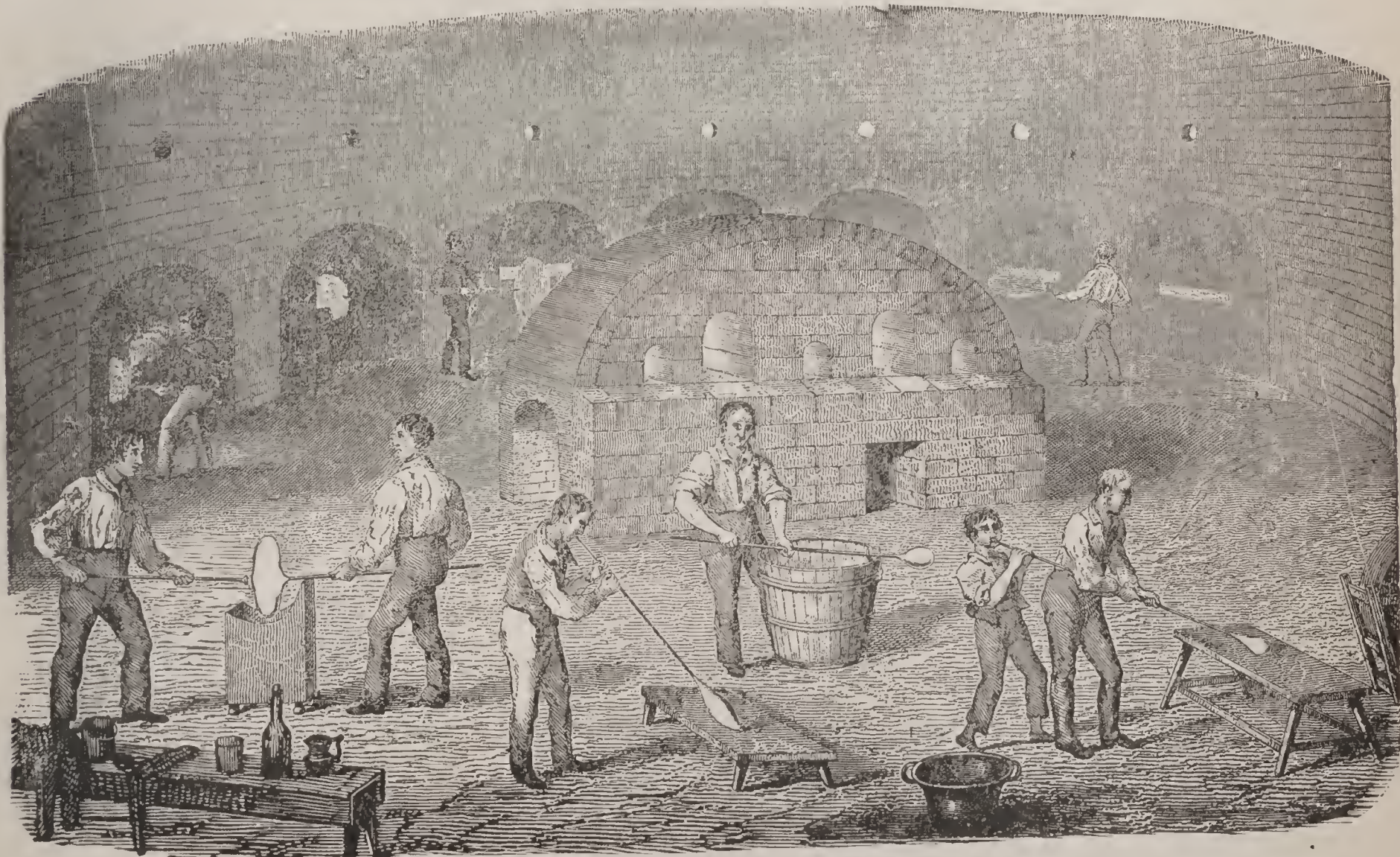


*Fig. 2.*

INTERIOR OF A CROWN-GLASS HOUSE.



# GLASS.

Fig. 1.

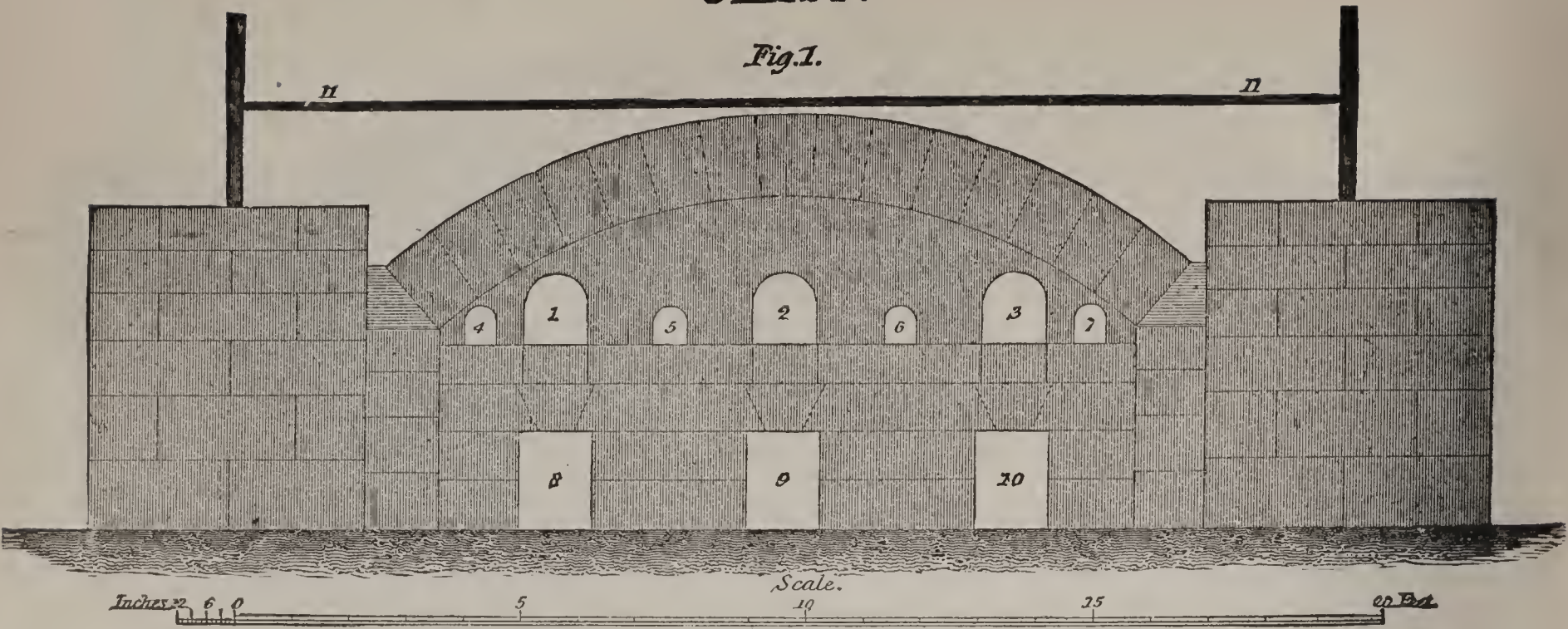


Fig. 2.

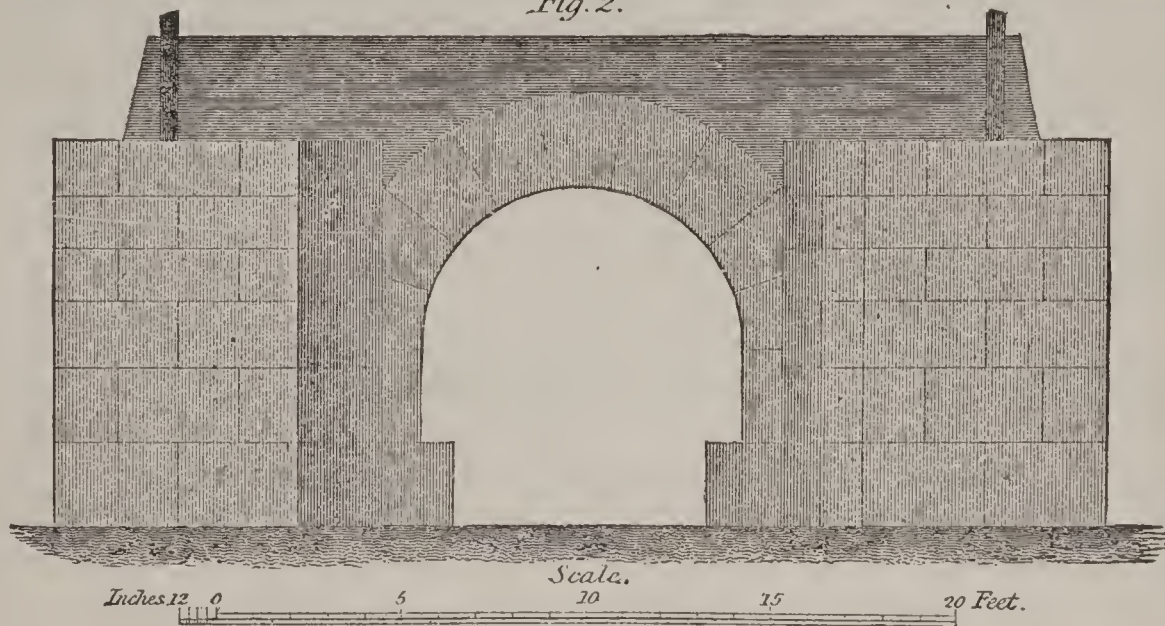
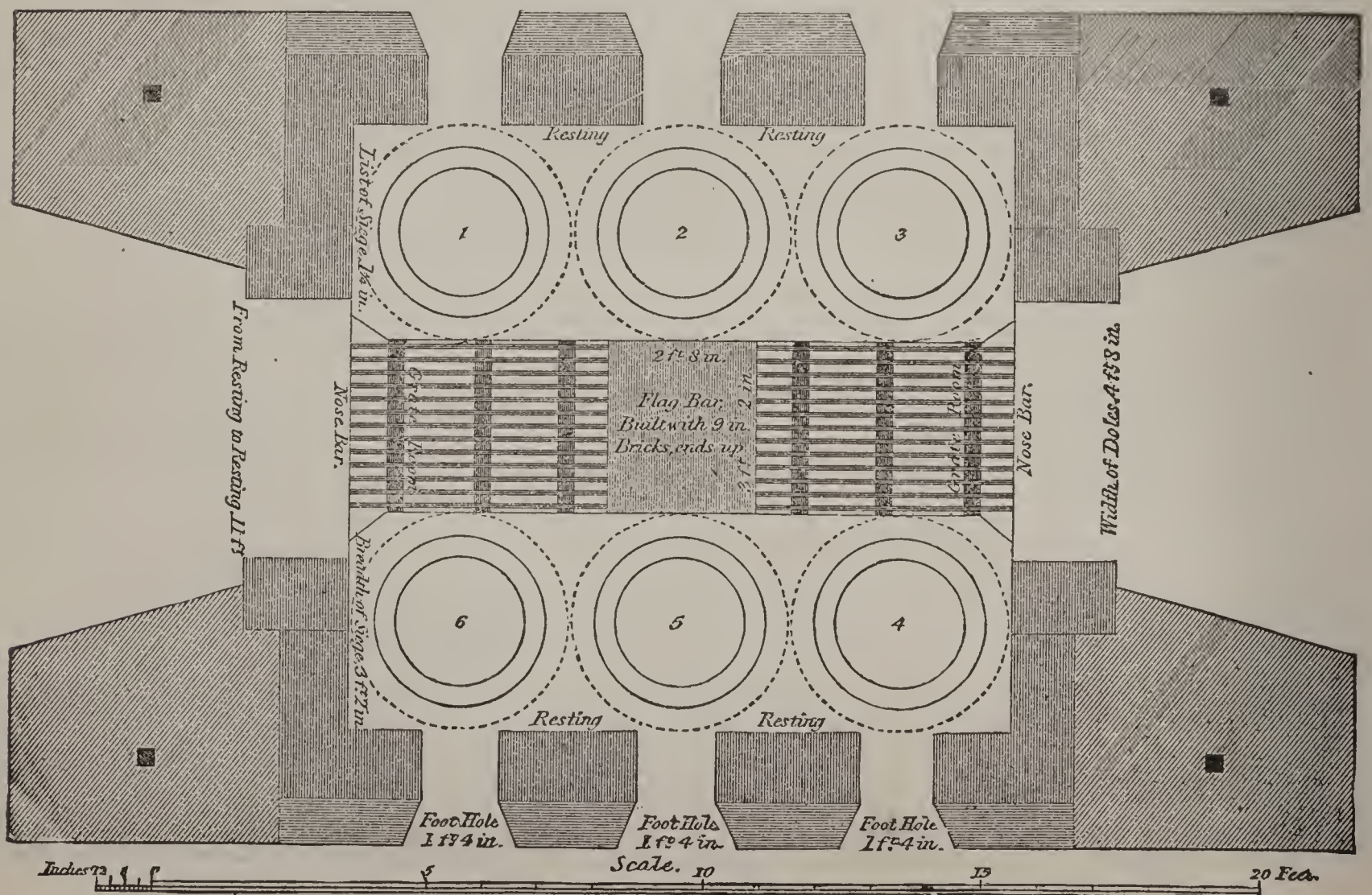


Fig. 3.

Inside Length of Furnace 12 Feet.





The history of the manufacture of glass in China is obscure, but the common opinion that it was learned from the Europeans in the seventeenth century seems to be erroneous.

Whether the making of glass in China was an original discovery of that ingenious people, or was derived *via* Ceylon from Egypt, cannot perhaps be now ascertained; the manufacture has, however, never greatly extended itself in China.

In the manufacture of ornamental glass the leading idea in China seems to be the imitation of natural stones. The colored glass is usually not of one bright color throughout, but semi-transparent and marbled; the colors in many instances are singularly fine and harmonious.

The chief source from whence a knowledge of the art of glass-making spread through Europe was probably Rome; in the Roman imperial period glass was undoubtedly made, not only in Italy, but also in France, in Spain, and in all probability at or near Cologne, and perhaps in other places near the Rhine. Whether refugees from Padua, Aquileia, or other Italian cities carried the art to the lagoons of Venice in the fifth century, or whether it was learned from the Greeks of Constantinople at a much later date has been a disputed question. It would appear not improbable that the former was the case, but it must be remembered that articles formed of glass were in the later days of Roman civilization in constant daily use, and that the making of glass was carried on, not as now in large establishments, but by artisans working on a small scale. It seems certain that some knowledge of the art was preserved in France and in Spain, possibly even in England, and it seems improbable that it should have been lost in that archipelago, where the traditions of ancient civilization must have been better preserved than in almost any other place. In 523 Cassiodorus writes of the "*innumerosa navigia*" belonging to Venice, and where trade is active there is always a probability that manufactures will flourish. However this may be the earliest positive evidence of the existence at Venice of a worker in glass would seem to be the mention of Petrus Flavianus, *phiolarius*, in the ducale of Vitale Falier in the year 1090. In 1224 twenty-nine persons are mentioned as *friolari* (*i.e.*, *phiolari*), and in the same century "*mariegole*" or codes of trade regulations were drawn up. The manufacture had then no doubt attained considerable proportions; in 1268 the glass-workers exhibited decanters, scent-bottles, and the like; in 1279 they made, among other things, weights and measures. In the latter part of this century the glass-houses were almost entirely transferred to Murano. From thenceforward the manufacture continued to grow in importance; glass vessels were made in large quantities, as well as glass for windows.

The efforts made in France, Germany and England, in the seventeenth and eighteenth centuries, to improve the manufacture of glass in those countries had a very injurious effect on the industry of Murano. The invention of flint glass in England (about 1620?) brought in its train the practice of cutting glass, a method of ornamentation for which Venetian glass from its thinness was ill adapted.

The fall of the Venetian republic was accompanied by interruption of trade and decay of manufacture, and in the last years of the eighteenth and beginning of the nineteenth century the glass-making of Murano was at a very low ebb.

The fame of Venice in glass-making so completely eclipsed that of Italian cities that it is difficult to learn much respecting their progress in the art.

The history of glass-making in France, Spain, Ger-

many and England offers many points of resemblance. In the first three, and probably in England also, glass was made at the period of the Roman empire; in France about Lyons, as is shown by a monument in the Musée Lapidaire to one Julius Alexander, described as an "*opifex artis vitriæ*," in Normandy and Poitou, and probably in many other parts. In Spain glass, according to Pliny, was manufactured in many parts of the country, "*per Hispanias*," but the remains of Roman glass-making have been chiefly in the valleys which run down to the coast of Catalonia, but also near the mouth of the Ebro, in Valencia and in Murcia.

Glass-making in Germany during the Roman period would seem to have been carried on extensively at Cologne, near which city many remarkable glass vessels of peculiar character have been discovered. The art was probably not lost during the period which followed the downfall of the Roman power.

It is not equally clear that glass was made in England, though it is probable that this was the case. Both vessels and window glass have been found in almost all parts of the country, and at Buckholt, near the Roman road from Winchester to Salisbury, the remains of a glass furnace, among which were numerous fragments of glass which may possibly have been of Roman origin, and a fragment of undoubtedly Roman pottery.

Very little has been ascertained as to the practice of the art in either of the four countries during the dark ages, but it would seem to have been preserved in France and Germany, and perhaps also in England and Spain.

In France "*vitarii*" are mentioned in several centuries from the sixth to the eleventh; in Germany, as has been shown above, there is ground for believing that the art was practiced in the eighth century; and in the twelfth artisans are found at Cologne with the designation "*ustor*" attached to their names, which Merlo suggests may probably mean maker of glass. Nothing seems to have been ascertained about the existence of the art in Spain between the Gothic conquest and the thirteenth century, when it was practiced at Almeria by the Moors.

During the mediæval period France produced large quantities of glass, as well in the form of vessels as in that of window glass.

Much glass was no doubt made for windows both in Germany and the Low Countries, during the Middle Ages, and in 1453 mention occurs of a fountain and four plateaux made for Philip the Good, duke of Burgundy, by a glass-maker of Lille; but if artistic objects were made, hardly any examples have been preserved. Glass-makers existed at Vienna in 1221.

In England vessels of glass seem to have been but little used during the Middle Ages; they occur very rarely in inventories, and when they do, as in the calendars of the Treasury of the Exchequer, they are usually described as mounted in gold and silver, or as painted, being probably enameled glass vessels from Constantinople, Damascus, or Venice, objects rather of virtu than of daily use.

In Spain glass was made at Barcelona in considerable quantities in 1324; and Almeria, according to an Arab author of the thirteenth century, was famous for its manufacture of glass. In the fifteenth century the export of glass from Barcelona was considerable; Jeronimo Paulo in 1491 says that glass vessels of various sorts were sent thence to many places and even to Rome.

In the sixteenth century the fashion of using glass vessels of ornamented character spread from Italy into France, England, and the Low Countries.

In Germany Ferdinand I. established a glass-house at



Weidlingen near Vienna, which was to work in the Italian manner, but no great success it would seem attended these efforts.

The branch of glass-making in which the greatest results were obtained in France during the seventeenth century was that of the manufacture of mirrors. In 1665 the services of eighteen Venetians were obtained, and a factory established in the Faubourg St. Antoine at Paris, and another factory was founded at Tour-la-Ville near Cherbourg. These were united and worked with great success; the plates which ornament the "Galerie des Glaces" at Versailles were made at Tour-la-Ville. In 1688, the process of casting plates of glass was first adopted in modern times (for the window glass of Roman times was cast); and thus it became possible to make mirrors of dimensions which could not be attained as long as the plates were produced by blowing. The manufacture was carried on at St. Gobain, still the seat of an immense production of glass.

English glass-making of the seventeenth century is distinguished by one of the most important innovations in the practice of the art which has at any time been introduced, that of using a large proportion of oxide of lead in combination with potash. Glass so made is more brilliant than other kinds, and is known in England as "flint-glass," in France as "crystal." The employment of lead as one of the ingredients of glass was not a discovery, for it had been practiced to a small extent and for certain purposes, as in the imitation of gems by the Romans, and through the Middle Ages. Neither the date when flint glass was made nor the inventor of the process is known.

During this century much art and labor were employed in Germany in the ornamentation of vessels for drinking, such as goblets and *wiederkomms*. Sometimes they were painted in *grisaille*, the subjects being battles, processions and the like, sometimes engraved or etched; common subjects are escutcheons with arms, views of cities, ciphers, etc. Many excellent artists worked in these various styles.

Although during the eighteenth and earlier part of the nineteenth centuries progress was made both in the purity and in the beauty of the material (especially in the case of glass for optical purposes), and in the organization and working of factories, it was a period marked in no country by much of novelty or of artistic effort in the manufacture of glass.

The manufacture of colored glass for windows was a consequence of the revival of pointed architecture, and England, France, Belgium and Germany have in this century rivaled each other in its production.

#### THE MANUFACTURE OF GLASS.

Glass, in its ordinary signification, is a brittle, transparent compound produced by the fusion, at a very high temperature, of silica (silicic acid) with one or more basic substances, one of which, in all cases, must be an alkaline metal. The substances which form the essential basis of all varieties of common glass are (1) silica as the acid element; (2) soda or potash as the alkaline base; and (3) lime and oxide of lead as the alkaline earths. To the alkaline earths commercially employed there ought also to be added baryta and alumina, the former being used in the place of lead, and the latter being a common ingredient in certain kinds of glass.

Various authorities who have investigated the constitution of glass have endeavored to establish a chemical formula for what they term normal glass. The results arrived at, however, by different investigators disagree among themselves; and the balance of opinion is in favor of the view that no such substance as normal glass exists, and that glass does not result from any definite

chemical compounds, but is simply a mixture of silicates, with usually an excess of uncombined silica. The proportions in which the ingredients of glass are present, however, have not only a very great influence on the fusibility of the mass, but these conditions also very materially affect the quality of the substance. In general, the more nearly the proportion of silica approaches the amount necessary to form definite compounds with the basic ingredients, the better and the more stable is the quality of the glass.

Glass is an extremely bad conductor of heat, and from that property springs, in great measure, its brittleness. Owing to this imperfect conductivity it necessarily results that a mass of glass, or a glass object cooling from a state of fusion, becomes cooled and set or solidified on its outer surface before the internal molecules have parted with their heat, contracted, and established themselves in a stable relation to each other. The solidification of the superficial stratum thus necessarily hinders the contraction of the internal portion of the mass, and as the internal molecules cool down a state of tension is created, the central portion tending to draw the surface stratum inward with a force held in check by the strain in the contrary direction of the outer range of molecules. In this condition a very moderate impact is sufficient to determine the fracture of the glass. The high degree of brittleness which results from unequal cooling is exhibited in a very marked manner by the philosophical toy known as "Rupert's drops." Such pear-shaped masses of glass are prepared by allowing molten glass to fall, drop by drop, into cold water, with a finely tapering point. Of course a very sudden and rapid cooling of the surface takes place, while the interior is still at a high temperature, and correspondingly much dilated, the consequence of which is that a state of great tension is established between surface and center. The breaking off of a small portion of the tail is sufficient to destroy the equilibrium established between the hard superficial and the dilate internal molecules; and immediately the whole mass is shattered to dust with explosive violence. Excessive brittleness is overcome by the operation of annealing to which glass is submitted.

The raw materials of the glass manufacture embrace the following principal ingredients: (1) Silica is used in the forms of pure quartz (for very fine qualities of glass), crushed sandstone, pulverized flints, and especially sand of degrees of purity varying in proportion to the quality of the glass to be made. (2) Lime is employed in the form of chalk or marble, either burned or unslaked, and it also must for colorless glass be free from impurities. Of (3) potash and (4) soda any of the ordinary salts except chlorides, but especially sulphates and carbonates, are indifferently utilized, the point of real importance being here also the freedom of the compound from contamination when fine glass is being made. (5) Lead is the characteristic ingredient of a distinct class of glass or which ordinary flint glass is the type. It is usually employed in the form of minium or red lead, partly on account of its fine state of division and partly because by giving off oxygen it helps to purify the metal. (6) Baryta and witherite or baric carbonate have been introduced with much success as a partial substitute for alkali in soda or potash glass, and for a part of the lead in the ordinary flint glass, and in all probability barium compounds are destined to occupy a much more important place in glass manufacture than hitherto they have done. (7) Cullets or waste and broken fragments of the special kinds of glass to be made is an important and essential ingredient, being added to the extent of about one-third of the whole charge in the melting and preparation of glass. These materials constitute the



essential ingredients which go to the formation of glass. In coarse varieties, such as bottle glass, alumina and iron are present, but their presence simply results from the inferior and impure nature of the raw materials employed, and are neither essential nor desirable. Some portion of alumina, too, is taken up from the pots in which the materials are melted. Bleaching or oxidizing agents are also employed to produce a high degree of colorlessness in clear glass, and for this purpose peroxide of manganese, arsenious acid, and nitrate of potash are the materials generally used. These bodies oxidize carbon compounds which may be present, and neutralize to a large extent the color yielded by iron by converting its protoxide into peroxide. Too much manganese, however, gives the glass a reddish tinge, and excess of arsenic produces a milky cloudiness. The requisite proportions of the raw materials ground and prepared are intimately mixed with the aid of a mixing apparatus, and in this form constitute the "batch." Formerly it was the habit to frit or partially decompose and fuse the ingredients in a form of reverberatory furnace called a calcar arch, but since the use of kelp was abandoned that operation is no longer essential, and generally the well-mixed batch is placed at once in the melting pots, or the tank in the case of tank furnaces.

*Melting Pots.*—These pots or crucibles are made of the finest fire-clay. Great care is requisite in the selection, and in cleansing the clay from extraneous particles, the presence of which, even in the smallest degree, will injure the pot. Pots last upon an average from eight to ten weeks, and they form a costly item in the manufacturing operations, as each pot is worth on an average about £10; and many of them, notwithstanding all care, crack and give way as soon as they are placed in the melting furnace. For all varieties of glass, excepting lead glass, open pots in the form of a truncated cone are employed; but for flint glass a covered pot with an opening at the side is essential.

*Furnaces.*—A glass-melting furnace or oven is a modified form of reverberatory furnace, which assumes many different shapes and arrangements according to the kind of glass to the manufacture of which it is devoted, and the nature of the fuel used. The form assumed by melting furnaces is, in general, square or oblong for sheet and plate glass making, and circular in English flint-glass making. The fire-space or grate occupies the center of the furnace, and the fire, when fuel is used for direct heating, is either fed or stoked from both ends, or raised from under the bars by a patent method. The fire-grate is usually on a level with the floor of the house in which it is erected, but under it is an arched subterranean passage forming the "cave" or ash-pit, both ends of which extend to the open air outside the glass-house. The fire-grate bars are placed in the top of this arched passage, which thus serves as a canal for the atmospheric air required to maintain combustion within the furnace; and for regulating the admission of air, and so controlling the heat, there are doors at both ends of the archway. In some cases two such arched passages at right angles to each other, and intersecting at the fire-bars are constructed, so that either can be used according to the prevailing direction of the wind, etc. In general no flue or chimney is directly connected with the furnace, the only exit for the products of combustion being the working holes, and thus heat is directed around and over each pot placed opposite a working hole in the furnace. Within the furnace, around the grate space in the case of circular furnaces, or on both sides of it in quadrangular furnaces, is a raised bank or narrow platform termed the "siege" on which the melting pots are placed. The number of pots arranged in a furnace vary from four to

ten, and each is reached, either for charging or for working off the prepared metal, by means of "working holes" in the side of the furnace situated directly over the pots. The general form and construction of a six-pot crown-glass furnace, which also may be taken as the type of sheet and plate-glass furnaces, is shown in full page plate, where fig. 3 is a ground plan at the level of the siege of a common form of furnace, while in fig. 1 is seen a front elevation of the same furnace, 1, 2, and 3 being the working holes, 4, 5, 6, and 7 pipe-holes for heating the blowing pipes, and 8, 9, and 10 foot-holes for mending the pots and sieges. The furnace is covered with a low-roofed crown or dome, and the whole structure is bound together with a system of iron bars. The materials used in the construction and lining of all furnaces must be selected with the utmost care, and built with special regard to the enormous temperature to which they are subjected.

An English flint-glass furnace furnishes the type of circular furnaces. Usually a large number of pots, sometimes ten, are provided for in such a furnace, because, the objects made in flint glass being in general of small size, the metal is worked off only slowly, and a large number of glass-blowers can be accommodated at the separate work-holes. The arrangement of the cave and fire-grate are the same as in the case of square or oblong furnaces, but flint-glass furnaces differ from the prevailing rule in others by being provided with a system of flues and chimneys, one flue being placed between each pair of pots. The general appearance presented within a flint-glass house is illustrated in full page plate, fig. 1.

In the year 1861 Dr. C. W. Siemens introduced a form of furnace in which the use of melting pots was altogether abandoned, and the batch was introduced into, melted in, and worked from a tank, which occupied the whole bed of the furnace. This furnace he heated from the sides by means of his well-known regenerative gas system. In 1872 he effected a further development of the tank furnace by dividing the tank, on the principle of his melting pot, by means of two floating bridges or partitions into three compartments.

The whole of the pots in a common furnace are charged or filled with the prepared "batch" at the same time. Immediately the heat is forced, and the stoking must thereafter be carefully regulated to maintain the high temperature. As the mass begins to fuse it settles down and occupies considerably less space in the pot, to which thereon a second quantity of material is added, and generally a third portion is subsequently filled in so as to have at the close of the melting process as large a quantity of metal as possible. When the fusion is complete, a scum, composed of uncombined salts, and known as glass gall or sandiver, rises and collects on the surface. It consists almost entirely of sulphate of soda, with sulphate of lime, and a small percentage of chloride of sodium. This scum of glass gall is carefully removed with a perforated scoop, and the heat of the furnace is then forced to the most intense degree with the view of rendering the metal as fluid and limpid as possible, so as to free it from all included gaseous bubbles which it still contains. This process of "fining," "refining," or hot-stoking, as it is indifferently termed, involves a temperature which is estimated in certain cases to reach from 10,000° to 12,000° Fahr.; and the operation is sometimes assisted by stirring the molten mass with a pole of wood, in a manner analagous to the poling of copper in the refining of that metal. Throughout the operation of melting, test pieces are periodically withdrawn from the pots for the purpose of observing the progress and condition of the glass. When it is found that the vitrification is complete and the object of refin-



ing fully accomplished, the heat of the furnace is considerably reduced, so that the glass may be brought into that condition of viscosity in which it is capable of being worked. In contradistinction to the refining and hot-stoking period, this is known as cold-stoking.

*Glass Working.*—The means by which melted glass is caused to assume its varied forms for use are (1) by blowing; (2) by casting; and (3) by pressing in molds—an operation in which the other two processes may be partly combined. Minor manipulative processes which do not fall under any of these heads are called into action; but these are for the most part merely subsidiary to the others, which really comprehend all the lines along which the formation of glass proceeds.

Having regard principally to the forms into which the glass is worked and the uses to which it may be applied, the following classification embraces the principal departments of the glass-making industry.

I. Flat glass—Crown glass; sheet glass; plate glass.  
II. Hollow glass—Flint glass, blown; Bohemian glass; Venetian glass; bottle glass; slag glass (Britten's); tube and gage glass. III. Pressed and massive glass—Flint glass; optical glass; strass; rod glass, marbles, and beads.  
IV. Colored, opaque, and enamel glass, including glass mosaics and hot cast porcelain, etc.

*Crown Glass.*—This, with sheet or cylinder glass, forms all ordinary blown window glass. Both varieties are precisely the same in composition.

In manufacturing crown glass, the metal being brought to a proper condition for working, the "gatherer" dips into the pot of metal an iron pipe or tube six or seven feet in length, of the shape of a rocket with a mouth-piece at one end, heated at that end which takes up the glass, and by turning it gently round, gathers about one and one-half pounds of liquid glass on the end of it. Having allowed this to cool for a little, he again dips the rod into the pot, and gathers an additional quantity of from two and one-half to three pounds. This is also permitted to cool as before, when the operation of dipping is again repeated, and a sufficient quantity of metal, from nine to ten pounds weight, is "gathered," to form what is technically called a table or sheet of glass. The rod, thus loaded, is held for a few seconds in a perpendicular position, that the metal may distribute itself equally on all sides, and that it may, by its own weight, be lengthened out beyond the rod. The operator then molds the metal into a regular form, by rolling it on a smooth iron plate called the "marver," a term corrupted from the French word *marbre*. He then blows strongly through the tube, and thus causes the red-hot mass of glass to swell out into a hollow, pear-shaped vessel. The tube, with the elongated sphere of glass at the end of it, is then handed to the "blower," who heats it a second and third time at the furnace, pressing the end, between each blowing, against the bullion bar, so called from the part thus pressed forming the center of the sheet or "bull's eye," and by the dexterous management of this operation, the glass is brought into a somewhat spherical form. The blower now heats a third time at the "bottoming hole," and blows the metal into a full-sized flattened spheroid. When this part of the process has been completed, and the glass has been allowed to cool a little, it is rested on the "casher box," and an iron rod, called a "pontil," or punty rod, on which a little hot metal has been previously gathered, is applied to the flattened side, exactly opposite the tube, which is detached by touching it with a piece of iron, dipped beforehand in cold water, leaving a circular hole in the glass of about two inches diameter. Taking hold of the punty rod, the workman presents the glass to another part of the furnace called the "nose hole," where the aperture made by its sepa-

ration from the tube is now presented and kept until it has become sufficiently ductile to fit it for the operation of the flashing-furnace. While here, it is turned dexterously round, slowly at first, and afterward with increasing rapidity; and the glass yielding to the centrifugal force, the aperture just mentioned becomes enlarged. The workman, taking great care to preserve, by a regular motion, the circular figure of the glass, proceeds to whirl it round with increasing velocity, until the aperture suddenly flies open with a loud ruffling noise, which has been aptly compared to the unfurling of a flag in a strong breeze; and the glass becomes a circular plane or sheet of four and one-half feet diameter, of equal thickness throughout, except at the point called the bullion or bull's eye, where it is attached to the iron rod. The sheet of glass, now fully expanded, is moved round with a moderate velocity until it is sufficiently cool to retain its form. It is carried to the mouth of the kiln or annealing arch, where it is rested on a bed of sand and detached from the punty rod by a shears. The sheet or table is then lifted on a wide pronged fork, called a faucet, and put into the arch to be tempered, where it is ranged with many others set up edgewise, and supported by iron frames to prevent their bending. From 400 to 600 tables are placed in one kiln. A sketch of the interior of a crown-glass house, during the progress of these operations, has been given in full page plate, fig. 2. The kiln having been clayed up, the fire is permitted to die out, and the heat diminished as gradually as possible. When the glass is properly annealed, and sufficiently cold to admit of its being handled, it is withdrawn from the oven after the removal of the wall built into the front of the arch, and is then quite ready for use. The largest sized tables of crown-glass made will cut into slabs thirty inches across, from which squared pieces measuring thirty-eight by twenty-four or thirty-five by twenty-five inches may be obtained.

*Sheet Glass*, as already mentioned, is the same in composition as crown glass, which it has now entirely supplanted.

Sheet-glass making involves two principal operations: (1) the blowing of the cylinder, and (2) the opening, flattening, or spreading of the glass. The structure and internal arrangements of the melting furnace is practically the same as in the case of crown glass. When the metal is ready for working, the workmen take their stations, each having his own pot and stage and also an assistant, and commence making the cylinders. After gathering the quantity of metal required (which on an average amounts to 20 lbs.), the workman places it in a horizontal position in the large hollow of a wooden block, which has been hollowed so that, when the workman turns the metal, it shall form it into a solid cylindrical mass. In the meantime the assistant, with a sponge in his hand, and a bucket of water by his side, lets a fine stream of water run into the block, which keeps the wood from burning, and also gives a brilliancy to the surface of the glass. The water, the moment it comes in contact with the glass, is raised to the boiling point, and in that state does no injury to the metal; but it is only when the metal is at a high temperature that such is the case; for, whenever the glass is cooled to a certain degree, it immediately cracks upon coming in contact with water. When the workman perceives that the mass of metal is sufficiently formed and cooled, he raises the pipe to his mouth at an angle of about seventy-five degrees, and commences blowing it, at the same time continuing to turn it in the wood block, till he perceives the diameter to be of the requisite dimensions, which are usually from eleven to sixteen inches. The workman then reheats his cylindrical mass, and when it is sufficiently



softened, commences swinging it over his head, continuing to reheat and swing till he has made it the desired length, which is commonly about forty-five inches. It is now a cylinder of say forty-five inches long by twelve inches in diameter, one end being closed, and the other having the pipe attached to it. The workman begins to open the end which is closed, for which purpose he incloses the air in the cylinder, by stopping the aperture of the pipe with his finger; and then placing the close end of the cylinder toward the fire, it becomes softened, while at the same time the air within is expanding, and, in about thirty seconds, the softened glass at the extremity of the cylinder gives way, forming an aperture. The workman then turns the cylinder round very quickly, and, by keeping the opened extremity warm at the same time flashes it out perfectly straight. If the burst edges are ragged in appearance they are trimmed by cutting with a pair of scissors before finally expanding. The bursting of the end of a thick heavy cylinder has to be determined by allowing a glowing drop of glass to fall on the spot to be burst before presenting it to the fire. The other end, which is attached to the pipe, has now to be cut off, and is done in the following manner: The workman, having gathered a small quantity of metal on the pontil, draws it out into a thread of about one-eighth of an inch in diameter, laps it round the pipe end of the cylinder, and, after letting it remain there for about five seconds, withdraws it suddenly, and immediately applies a cold iron to the heated part, which occasions such a sudden contraction, that it cracks off where the hot string of glass has been placed round it.

*Flattening.*—The cylinder so blown and detached is now allowed to cool; and, previous to its flattening, the burst extremity being thinner than the remainder, and slightly contracted at its edge, has to be removed to the depth of about two inches. For this purpose the cylinder is placed vertically in the jaws of a cutting instrument, having a diamond cutter, pressing by a spring, inside the glass. The cutter moves by small wheels on the table on which it is placed, and being pushed around the cylinder it makes an accurate cut of uniform height. The cylinder has then to be split longitudinally to allow it to be opened out to a flat sheet. To accomplish this the practice was formerly to lay the cylinder horizontally on a bench, and draw a red-hot iron two or three times along the inner surface at the line of desired fracture. Now the splitting is done with a diamond cutter fixed in the cleft of a stick and guided from end to end of the cylinder by a straight-edge laid within it. The cylinder is now ready to be taken to the flattening kiln, which consists of two chambers built together, the one for flattening the cylinders, the other for annealing the sheets, the former being kept at a much higher temperature than the latter. The cylinder, after being gradually reheated, is placed in the center of the flattening oven, upon a smooth stone, with the split side upward. In a short time it becomes softened with the heat, and by its own weight falls out into a flat square sheet of forty-five inches by thirty-six. The flattener, with a piece of charred wood, rubs it quite smooth, and then places it on edge in the annealing arch, where it remains about three days to be annealed.

Polished sheet glass is known in commerce as patent plate glass, to distinguish it from the ordinary polished cast-plate. The polishing process involves two operations—smoothing and finishing or polishing. The smoothing is done on a thick slab of slate, which must possess a surface as smooth and level as possible. This is covered with a piece of wet cotton cloth, and, the sheet of glass to be smoothed being laid thereon, by gentle pressure all air is expelled from between the surfaces, and the atmospheric pressure then keeps the glass

firmly in position. The process of smoothing and the subsequent finishing are from this point the same as in the case of ordinary plate glass, under which head these operations will be detailed. It is only selected plates of fine clear metal that are used for polishing.

*Plate Glass* is manufactured by a process entirely different from any of those yet described, consisting as it does of glass cast and spread in sheets. As plate glass is invariably thicker than blown sheet, it is of the utmost consequence that the "metal" should be prepared from the purest possible materials, and that the founding or melting should be done with great care to ensure the expulsion of air-bubbles. The materials are melted in furnaces and pots of the ordinary construction, but in some cases the melting pots are of greater capacity, and contain charges of from two to two and a half tons.

The casting table is a heavy, thick, flat table of cast-iron, of a length and breadth exceeding the size of the largest plate of glass which may be cast on it. At one end is placed a heavy cast-iron roller, the full breadth of the table, and fitted to roll the whole length of the table by means of spur wheels working into gearing along its sides. The cast-iron roller determines the thickness of the glass by the height at which it is caused to roll above the table, and that height is regulated by placing narrow strips or ribs of metal of the required thickness of the glass along the edges of the table on which the two extremities of the roller bear as it revolves. The breadth of the plate, again, is determined within the limits of the table by the two sides of the "gun," an apparatus consisting of two plates of cast-metal, placed in front of the roller, and bolted together by cross bars at a distance apart which can be easily altered and adjusted, according to the breadth of plate the apparatus is intended to control. The edge of the plates abutting against the roller are accurately fitted to roller curvature, and thus they and the roller form three inclosing sides for the molten mass poured on the table, and as they travel forward they carry in front of them all the semi-fluid mass except the uniform layer which represents the distance between the moving surface of the roller and the surface of the casting table on which the glass is spread. As the glass does not instantly solidify the moment the roller has passed over and spread it into a sheet, the edges generally assume a rounded and somewhat wavy cast-like appearance. Immediately the plate has sufficiently solidified to bear moving, it is taken to the annealing furnace, the heat of which has been carefully raised to the proper pitch. The sole of the annealing oven on which the plate is to rest (for with large plates any piling on edge is impracticable) must be as smooth and level as possible, since the still semi-plastic mass molds itself to the surface on which it is laid. As the oven only accommodates a single plate of the largest dimensions, and since the annealing process occupies several days, a large number of ovens, occupying a great space and involving the expenditure of much labor and fuel, are needed in works where many plates are cast. In dealing with plates of small size, they may be laid horizontally on the furnace bed for a little till they come to the furnace temperature, after which they are piled up on edge in twenties or thirties, leaning against a range of iron bars running across the furnace. When the plates have been deposited in the annealing oven, the openings are all carefully stopped up, and the furnace, with its contents, is cooled by slow degrees down to a temperature at which the glass may safely be withdrawn and exposed to ordinary atmospheric influences. The cooling of such furnaces is now hastened, as far as the safety of the plates and the completion of the annealing will permit, by allowing cold currents of air to pass under their sole.



The plates, as withdrawn from the annealing oven, have a very irregular, rough, undulating surface, and although the glass is perfectly pure, they have, owing to their uneven surface, no transparency. In this condition they constitute the "common rough plate" of commerce, and as such they are extensively used for the glazing of roofs, for floor and cellar lights, and generally in positions where light without transparency is requisite.

*Polishing.*—When the annealed plates are withdrawn from the oven they are carefully examined for any defects, such as spots, air-bells, etc., which they frequently exhibit. If serious defects are found, the plates are cut into the largest pieces which can be obtained free from flaws, and the selected pieces are then submitted to the operations of polishing, consisting of—(1) grinding, (2) smoothing, and (3) polishing. Various forms of machine have been devised and introduced for effecting these operations. The grinding and smoothing table consists of a great revolving flat table, with a strong fixed bar, stretched across it about ten inches above its surface, to which two runner-frames, shod with iron, are pivoted. The glass to be ground is cemented with plaster of Paris on the surface of the table, and the runner-frames rest on the surface. When the table is set in motion, each oblong runner-frame has communicated to it a revolving motion also, owing to the excess of friction brought into action by the more rapid revolution of the outer edges of the revolving table. The effect of these compound revolutions is that every point of the surface of the glass is equally and uniformly abraded, when the apparatus in revolution is fed with sharp sand and water. When a level surface is thus prepared, the smoothing process is next begun on the same table, the only difference being that emery powder of increasing degrees of fineness is substituted for the sand, and as the operation approaches completion the utmost care must be exercised as to the purity and uniformity of the emery, seeing a single particle of grit would effectually destroy the smoothness of a whole plate. The quality of the emery is thus of essential consequence, an ingenious apparatus is brought into use for arranging the sizes by means of a current of water of diminishing velocity, obtained by passing a uniform stream with agitation successively through cylinders or troughs of increasing size. In these troughs the emery powder is deposited in increasingly fine division, according to the growing capacity of the trough and the consequent slow replacement of its contents. The last touches of the smoothing process can only be given by the hand, which at once detects any appearance of grittiness. Both sides of the glass are in succession submitted to these operations, after which it is again bedded in plaster and fixed on the polishing table. The polishing is done with reciprocating rubbers, covered with fine felt, and supplied with rouge (peroxide of iron) in a liquid state. While a reciprocating motion is communicated to the rubbers, the table itself moves backward and forward in a transverse direction, so that all parts of the plate are equally brought under the polishing influence of the rubbers. About forty per cent. of the weight of the rough plate is removed in the three polishing operations.

*Flint Glass or Crystal.*—The name flint glass originated in the circumstance that at first the silica used in the manufacture of that variety of glass was in the form of ground flints.

Flint glass is a compound entirely different from those above described, consisting as it does of a silicate of potassium and lead. As is the case with all kinds of glass, its composition and the proportion of ingredients used in its preparation vary widely.

Flint glass is in no case used for architectural or structural purposes, but its purity and luster peculiarly fit it for table glass, ornamental objects, glass globes and lusters, and for imitations of gems and precious stones. For the latter purpose a dense glass called strass, appropriately colored when necessary, is employed, and a glass of still greater density and refractive power is used for optical purposes. The softness of flint glass adapts it for engraving, cutting and polishing; and these methods of ornamenting the finished glass are very much employed.

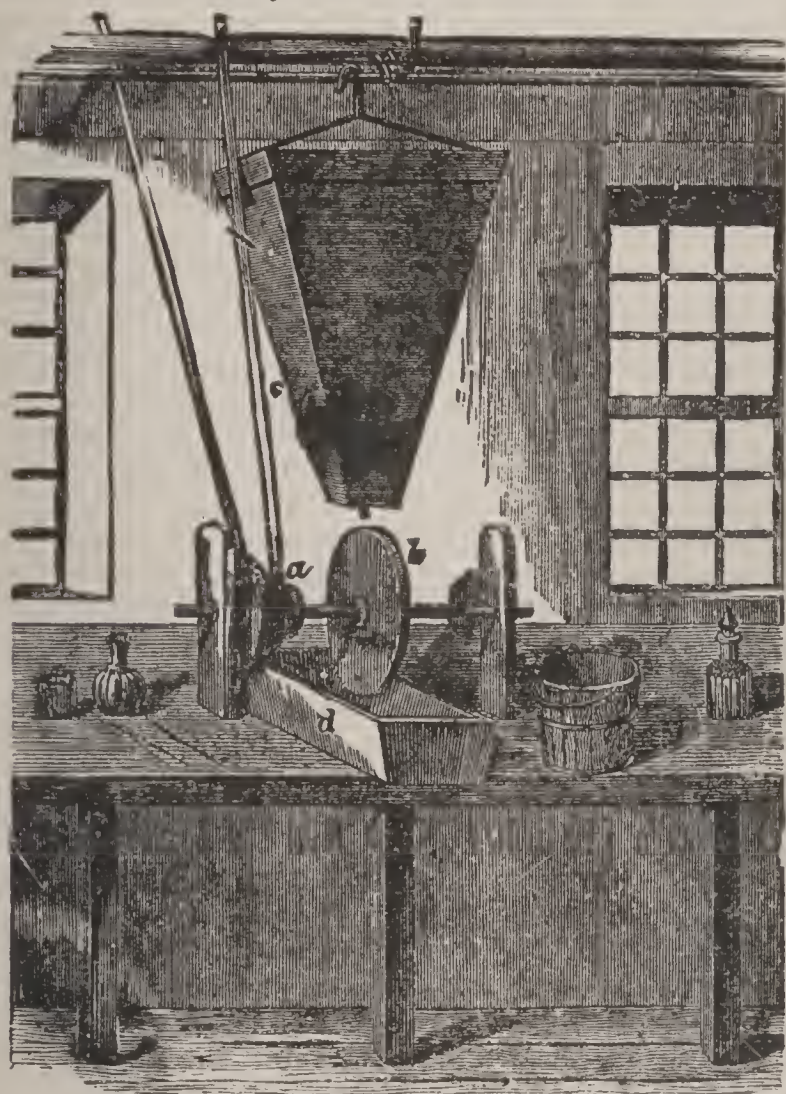
Fig. 1, full-page plate, represents the various arrangements, tools, and processes connected with a flint-glass house, the building in the center being the large cone or chimney built over the furnace, which is seen through the arches *a*. At 5 and 6, men are seen at the working holes withdrawing metal from the pots on their long iron tubes; 7 is the marver on which the gathering is rolled till it acquires a circular shape; at eight a blower is seen in process of expanding a gathering of glass by blowing; and at nine a servitor or second man is attaching a post or lump of metal he has gathered on a pontil or ponty to the end of a blown globe of glass. The two masses of glass are thus united together, and that attached to the hollow tube is separated by touching it, near to where the tube enters the globe, with a small piece of iron wetted with water. By this means the glass cracks, and a smart blow on the iron tube completes the disunion. The workman now takes the ponty from his assistant, and laying it on his chair arm, rolls it backward and forward with his left arm, while with his right he molds it into the various shapes required by means of a very few simple instruments. By one of these, called a pucellas, the blades of which are attached by an elastic bowlike a pair of sugar-tongs, the dimensions of the vessel can be enlarged or contracted at pleasure. Any superfluous matter is cut away by a pair of scissors. For smoothing and equalizing the sides of the vessel a piece of wood is used. After the article is finished it is detached from the ponty and carried on a pronged stick to the annealing oven.

The annealing oven or leer for flint glass is a low arched furnace, generally of considerable length, with several openings at each end between which narrow lines of rails run. On these rails, small wagons, or trays mounted on four wheels, are placed, and the articles to be annealed are filled into such wagons. They are slowly pushed to the hottest part of the chamber, and passing that point they very gradually approach the cold end of the oven, from which they are withdrawn fully annealed. As each wagon is withdrawn at one end, another is entered at the other, so that the line from end to end is kept constantly full. The ordinary method of gradually decreasing the temperature around the articles stationary in the leer is also practiced.

The sparkle and brilliancy of flint glass is developed by the process of grinding and polishing technically called glass-cutting. In the illustration is seen a representation of a glass-cutter's mill, *a* being the pulley and band communicating motion to the mill, *b*, which is made of wrought or cast iron. Over it is suspended a wooden trough or cistern *c*, containing a mixture of sand and water, which is fed on the wheel as required for the operation of grinding. Smoothing is done on a wheel of fine sandstone to which water alone is applied, and for polishing, a wooden wheel supplied with emery, and finally with putty powder (oxide of tin), is employed. The trough *d* under the wheel receives the detritus of the grinding and other operations. The articles are held in the hand, and applied to the mill while rotating.



The punty marks are ground off tumblers, wine-glasses, and the like, by boys holding them on small stone mills. Ground or obscured glass is made by rubbing the surface with sand and water. Iron tools fixed on a lathe and moistened with sand and water are used to rough out the stoppers and necks of bottles, which are completed by hand with emery and water. Engraving is the production of ornamental surfaces by a fine kind of grinding mostly done with copper discs revolving in a lathe. Etching is variously done by submitting the portions to be etched or bitten to the influence of hydrofluoric acid, or the sand-blast, the remainder of the glass being stopped off or protected by a coating of wax or some pitchy compound.



Glass-Cutter's Mill.

*Pressed Glass.*—The most brilliant effect is produced by cutting, but molding or pressing (claimed to be the invention of a Massachusetts carpenter) is much cheaper, and this branch of the art has now reached a high state of excellence. A metal that melts at a comparatively moderate heat, and does not quickly pass from the plastic state, is essential for success in pressed glass making, because it has not only accurately to fill all the intricacies of the mold, but it must also be susceptible of fire-polishing. This operation consists of a reheating sufficient to melt a thin superficial stratum of the glass, whereby the roughness and obscurity of surface incidental to molding is removed, and a smooth, brilliant effect brought out, inferior only to the sparkling appearance produced by cutting. The molds for pressed glass are made of iron or bronze; with great accuracy of surface; and they are, in use, kept a little under a red heat. The various segments of the mold are so hinged or connected as to close and leave internally a space representing the form and size of the article to be made, the internal hollow not being produced by blowing, but by the plunger of the press under which the mold is placed. The required quantity of metal being dropped into the mold, the plunger de-

scends and forces it into all parts of the cavity, completing immediately the formation of the article, which is then fire-polished by reheating, and afterward annealed.

*Baryta Glass.*—Baryta, it appears, can be used as a partial substitute for the alkalis in glass-making; and indeed it was affirmed by Peligot that carbonate of baryta could altogether supplant either potash or soda, and yield a glass perfectly free of alkali. Such a glass is, however, without practical value; but baryta may be used in the place of either lead or lime, to produce an easily fused dense glass much more brilliant than common glass, and in appearance and properties intermediate between that and flint glass.

*Bottle Glass.*—This department of glass manufacture is of importance on account of its enormous extent; and although the raw materials employed in the trade are coarse and impure, and though the finished product has little appearance of excellence, the quality of the glass is in the highest degree important.

The following is an outline of the process of making a common bottle. After the metal has been skimmed, the person who begins the work is the gatherer, who, heating the pipe, gathers on it a small quantity of metal. After allowing this to cool a little, he again gathers such a quantity as he conceives to be sufficient to make a bottle. This is then handed to the blower, who, while blowing through the tube, rolls the metal upon a stone, at the same time forming the neck of the bottle. He then puts the metal into a brass or cast-iron mold of the shape of the bottle wanted, and, continuing to blow through the tube, brings it to the desired form. The patent mold now in use is made of brass, the inside finely polished, divided into two pieces, which the workman, by pressing a spring with his foot, opens and shuts at pleasure. The blower then hands it to the finisher, who touches the neck of the bottle with a small piece of iron dipped in water, which cuts it completely off from the pipe. He next attaches the punty, on which is a little metal gathered from the pot, to the bottom of the bottle, and thereby gives it the shape which it usually presents. This punty may be used for from eighteen to twenty-four dozen of bottles. It is occasionally dipped into sand to prevent its adhering to the bottle. The finisher then warms the bottle at the furnace, and taking out a small quantity of metal on what is termed a ring iron, he turns it once round the mouth, forming the ring seen at the mouth of bottles. He then employs the shears to give shape to the neck. One of the blades of the shears has a piece of brass in the center, tapered like a common cork, which forms the inside mouth; to the other blade is attached a piece of brass, used to form the ring. The bottle is then lifted by the neck on a fork by a boy, and carried to the annealing arch, where the bottles are placed in bins above one another. This arch is kept a little below melting heat, till the whole quantity, which amounts to ten or twelve gross in each arch, is deposited, when the fire is allowed to die out.

*Optical Glass* is of two principal kinds—flint and crown—the combination of these two, with their different refractive powers, being necessary to produce perfect achromatism in the lenses of telescopes. For astronomical telescopes, for microscopes, and for all delicate scientific instruments in which optical glass occupies a place, glass of the utmost purity, transparency, freedom from color, streaks, and striæ is of the highest importance; and to secure these qualities to the fullest extent much care, trouble, and expense are requisite.

Optical flint glass contains more lead, and is consequently heavier and more refractive, than the quality used for common purposes. It is made in a furnace



having a single covered pot, and the secret of successful manufacture consists in constantly stirring the mass while it is in a molten condition so as to keep the heavier lead silicate from falling to the bottom. For the very highest qualities of optical glass, the contents of the pot are most scrupulously cleared, and the stirring is continued after the heat is lowered till the contents are cooled down to little more than a red heat. The furnace is then closed and the metal is allowed to cool and anneal gradually in the pot within the furnace. When withdrawn the pot is broken, and the mass of glass is polished on two opposite sides so that any imperfections may be detected by examination. From the mass, cut horizontally, perfect discs of such size as can be formed are then obtained. Optical glass is also blown into thick cylinders, and cast in slabs from quarter inch to one inch in thickness.

*Strass.*—Remarkably faithful imitations of every kind of precious stone can be made from suitably prepared and, when necessary, colored glass. The transparent basis from which artificial precious stones is prepared is called *strass* or *paste*, a material which must of necessity be the purest, most transparent, and most highly refractive glass that can be prepared. Among various mixtures given by Donault-Wieland as suitable for strass the following is an example:—powdered quartz 300 parts, red lead 470, potash (purified by alcohol) 163, borax 22, and white arsenic 1 part, by weight. Special precautions are adopted in the melting of the materials, and the finished colorless glass is used for imitating diamonds. When employed to imitate colored precious stones the strass is melted up with various metallic oxides, to which reference will be made under colored glass. Artificial precious stones are, of course, easily distinguished from real stones by their inferior hardness, and by chemical tests. They may also be generally detected by a comparatively soft warm sensation they communicate when applied to the tongue.

*Glass Tubes*, used for gauge glass for steam boilers and for many other purposes, are made by a very simple process; but as the manufacture is a separate department of industry it demands some notice. A gathering of glass is made on a blow-pipe, which is marvered, and slightly blown, so as to form a thick-walled elongated globe. To the end of this globe opposite the blowing pipe a pontil-rod is attached by an assistant, and the two workmen move backward the one from the other, drawing out the tube as they recede. One or two boys watch the process of elongation, and when the tube reaches the desired gauge they fan its surface so as to "set" the glass, and thus prevent further attenuation at that particular point. The relation of the mass of metal to the original cavity determines the comparative stoutness and bore or internal diameter of the tube, and it requires much dexterity to make a tube at once straight and of uniform gauge and diameter. In drawing out tubes of large gauge the operatives recede from each other at a slow rate; and in proportion as the size of tube decreases the rate of drawing out increases. In the Venetian factories, where small tubes for beads are made, the workmen move at a smart walking pace.

*Massive Glass.*—Under this term may be conveniently noticed the manufacture of various familiar solid glass objects which do not acquire their form either by blowing or pressing in the ordinary sense.

*Glass Rods* form the basis of many of these objects; and the formation of a plain rod of glass is accomplished by a manipulation in all respects similar to that described under the head of glass tubes, the only difference being that the rod is drawn from a solid instead of from a hollow or blown gathering as in the case

with tube drawing. From solid rod glass, glass buttons of various forms are "pinched" by heating the rod till it softens, and immediately pinching it in heated molds made and worked like ordinary pincers, but having molds of suitable form in place of the gripping surface of the pincers. The small facets of glass lusters and grandoles and glass marbles, are made by an analogous process.

*Spun Glass.*—Certain qualities of glass in the plastic condition are capable of being drawn out to threads of great tenuity, which, while possessing much brilliancy and beauty of color, are perfectly flexible and elastic, and feel to the touch soft and smooth like fine wool. The material is specially useful in military ornaments owing to the fine colors in which it may be produced, and to the fact that it is unalterable in and unaffected by all kinds of weather.

A remarkable and novel application of glass was patented in 1878. It consists in making glass a cementing or binding substance in the manufacture of emery wheels, now so much used instead of files. For preparing the wheels any broken fragments of glass are utilized. These are reduced to powder, mixed with proportions of powdered flints and emery, and in the form of a cake introduced on a layer of paper into a furnace where the material is submitted to a heat sufficient to fuse it into a compact ringing mass. The resulting cake is of intense hardness and durability, and cuts through ordinary emery wheels with ease.

*Colored Glass.*—When to the ordinary materials in the melting pot small quantities of various metallic oxides and other mineral substances are added, colored but still transparent glass is produced. The colors yielded vary in intensity according to the proportion of oxides used; and the temperature at which the fusion is effected, the length of time the molten glass remains in the melting pot, not only modify, but actually change altogether, the resulting color.

*Glass Painting.*—The manufacture of colored glass, which is the basis of the beautiful and interesting art of glass painting, originated at a period of remote antiquity, and the use of enamels, to vary or ornament its surface, was known to the ancient Egyptians; but the formation of windows of mosaics of colored glass upon which the shapes of figures and ornaments are painted with an enamel fixed by fire is mediæval, and emphatically a Christian art. In all probability it was suggested by the mosaic pictures with which churches were adorned from an early period for the instruction of the illiterate, as was shown by the inscription which they bore, "sanctæ plebi Dei." The step from mosaic pictures to glass mosaic windows was merely a question of time; it is not known when the step was taken, but colored windows existed in St. Sophia in Constantinople in the sixth century, while the basilicas of St. John Lateran and of St. Peter at Rome were adorned about the same time in the same manner. In the year 709 Wilfrid, bishop of York, invited workers in glass from France ("artifices lapidearum et vitrearum fenestrarum primus in Angliam ascivit"). The French claim the honor of having invented the process of painting upon the mosaic windows of colored glass, and of thus transforming them into works of art, and also of teaching this to the English, who in their turn instructed the Germans; but Muratori in the second volume of his *Antichità Italiche* of the Middle Ages, printed a treatise on mosaic and painted glass written by an anonymous Italian in the eighth century, and probably not later than the eleventh was written the interesting essay *Diversarum Artium Scheda Theophili Presbyteri et Monachi*, which details with minute accuracy the process of painted glass as it has been practiced with some



attempts and modifications, throughout the best periods of the art; it may reasonably be assumed that Theophilus describes methods invented before his time. Probably the oldest specimen of glass painting now existing is a window of the eleventh century in a church at Neuwiller, in Alsace, representing St. Timothy. The figure is rudely designed, but, with the rich border of ornament, shows that the executant knew his art, which in the following century is further illustrated by windows in St. Denis, near Paris, erected by the Abbé Suger, which are still preserved. It was, however, in the thirteenth century, that great age of the revival of art, that glass painting attained its first great development, and notwithstanding the claims advanced by France, it is most probable that as all art radiated from Italy as a general center of invention and progress, as well as of faith and dogma, so glass painting partook of the general impulse. Considered as a branch of fine art, Italian painted glass occupied a very high position at all periods of its history, for the designs were frequently made by some of the most famous of that long roll of immortal artists who have had so few equals elsewhere. In Germany the family of Hirschvogel of Nuremberg and other eminent artists, including, it is popularly believed, Albert Dürer, and in France Jean Cousin, Bernard Palissy, Louis Fauconnier, and others, equaled the Italian glass-painters, while both German and French artists excelled them in technical processes.

Besides being classified by centuries, Italian glass painting may be appropriately arranged under the following heads or schools:—the Pisan, Florentine, Sienese, Umbrian, Lucchese, Bolognese, Lombard, and Venetian; for notwithstanding the lamentable destruction of painted glass in Italy even now in progress, specimens by artists belonging to these schools still exist, and the names of a numerous array of glass-painters of these provinces are preserved. The best examples extant of this art in Italy of the first half of the thirteenth century are two couplets in the apse of the famous basilica of St. Francis at Assisi. In general arrangement and design they resemble windows of the same age in other parts of Europe classed by Mr. Winston under the general head of Early English, being divided into panels of varied and admirably designed geometrical forms surrounded by diapers and borders of rich fancy and glowing color, which, however, are rather more confused than similar details in contemporary glass elsewhere. The panels are filled with scripture subjects, and Italian skill and refinement are obvious in the design of the figures; this may be readily understood when it is considered that Italian artists of this time rendered the Greek art, universally followed, with more sentiment and power than any other people. The ornament shows the influence of Byzantine conventions, but the ornamentists imitated natural forms of foliage sooner than northern artists. A remarkable peculiarity of the early painted windows at Assisi, which are here taken as the best and almost the only specimens of thirteenth century glass left in Italy, is that throughout the couplets the backgrounds in each light differ in color. The subjects for instance in the right light are on a blue ground, on the left on a red ground, in other examples the grounds are alternately blue and green. It might be supposed that all unity of effect must have been destroyed in this way; but such is the skill with which the general harmony of color is arranged, that the counter-changes are less objectionable than might appear possible. Early Italian glass painting, like that of other parts of Europe, is characterized by an obvious ignorance of perspective on the part of the designers, but there are manifest indica-

tions of attempts to represent retreating surfaces and lines; that these have not the effect intended was not due, as some suppose, to the maintenance of a principle appropriate to glass painting, but simply to a want of knowledge of perspective laws common to all, even the greatest artists of the time.

In the next great age of art, that which commences with the triumphs of the genius of Giotto, glass painting evidently shared in the general progress.

Throughout the whole of the painted windows existing in Florence, of the fully developed style of the fourteenth century, and for a considerable portion of the fifteenth, the influence of the architectural design of Giotto and Orcagna is very perceptible. The color is especially noteworthy; the canopy, somewhat squat in form, is adorned in every part with rich and diversified colors evidently imitative of the varied marbles and the infinity of marble inlay and mosaics, characteristic of so much of the mediæval architecture of Italy; while in northern countries the canopies in windows, with their beautiful details of form showing such rich fancy and such graceful lines, are chiefly white, not that they are altogether colorless, for it is of the perfection of mediæval architecture to associate color with form.

In the history of painting glass in Italy during the fifteenth century, the windows of the cathedral of Florence, dating from 1390 to 1503, occupy an important position, not only by reason of their interest as connected with that celebrated church, but also because they were designed and executed by artists of highest reputation. The cathedral was founded September 8, 1298, the architect being Arnolfo di Cambio di Colle di Valdelsa. In 1334 Maestro Giotto was architect, and commenced the famous belfry. In 1364 the church was vaulted over at its eastern end, and, in 1420, Filippo Brunelleschi and Lorenzo Ghiberti, who built the clerestory of the nave, with its round windows and Renaissance cornice, were appointed joint architects. Painted glass was introduced into the windows thirty-six years before the completion of the cupola, and thirty before that of the clerestory. These dates are an interesting testimony to the importance attached at the time to painted windows as portions of the design of so great a church. They were erected in the aisles, before the nave was finished, by Don Lionardo di Simone, monk of Vallombrosa, and Niccolo di Pietro della Magna, so early as 1390, and, when the nave was roofed over by its architects, Fra Bernardino di Stefano executed the two first windows of the clerestory from designs by Lorenzo Ghiberti. Ghiberti is also alleged to have designed many of the painted windows at the east end of the church; but those now existing, judging by the design and color, as well as by the technical execution, cannot be his, for they are manifestly of earlier date, while the authorship of some of them is recorded in the archives without reference to Ghiberti. One only, on the north side of the apse and in the lower row, suggests the design of this great artist, the suggestion being strengthened by the fact that the diapered ornament on the ruby dress of the figure is made by the wheel, which brings this window within the fifteenth century, while the diapers in the other figures of the same series are executed in an older style. It has been stated that Ghiberti advised the municipality of Florence to invite a celebrated glass-painter of Lübeck, Francesco di Domenico Lievi da Gambassi, by letters, the second being dated October 15, 1436, to settle in Florence with special privileges; he came, and it is assumed that he painted Ghiberti's designs for glass, but of this there seems to be no satisfactory evidence. We find that in 1434, before his arrival, Maestro Domenico di Pisa painted the east window of the drum, representing the coronation of the Virgin, which was designed by Donatello in competition



with Ghiberti, and preferred. As it was on January 12, 1434, that Brunelleschi completed the dome, evidently no time was lost in commencing the painted windows. Bernardo di Francesco del Boni is recorded in the archives as having executed, in 1442, the following windows in the drum, called in Italian the tribune: The Resurrection, designed by Paolo Uccello, and the Ascension and the Prayer in the Garden, by Lorenzo Ghiberti, although by this time Francesco di Lievi da Gambassi had been some time in Florence. Bernardo del Boni is also recorded to have painted the Annunciation, designed by Uccello, removed some years ago, and the Ascension, described as being either by Ghiberti or Uccello; the uncertainty is curious. In 1448 the same artist painted the Presentation in the Temple, which was designed by Ghiberti. What windows, then, did the artist from Lübeck really execute? Born an Italian, he was instructed from his youth in Germany, and it is reasonable to suppose that his style would be German. Now, several of the upper windows of the transepts contain figures which have a decided affinity with German ideas, and it is not unreasonable to suppose that these were by the newcomer. He established furnaces by special permission, and it has therefore been hastily assumed that he manufactured colored glass; but these no doubt were to burn his painted glass.

Among the most active and able glass-painters of the prolific fifteenth century in Italy the Gesuati monks, whose convent was close to Florence and was razed to the ground during the siege when Michelangelo aided in the defense of the city, were celebrated. They prepared colors for artists, supplying Michelangelo when he painted the Last Judgment, and they executed numerous windows of which there are records from 1467 to 1562.

A glass-painter was now to make his appearance in Italy who was destined, although a foreigner, to eclipse in the opinion of the Italians all previous masters of the art; this was Fra Guglielmo di Marsillat, born in the diocese of Verdun in 1475. It is not known under whom he studied glass-painting, but for protection from the consequences of some escapade he entered the Dominican order. Claude, an eminent French glass-painter, being summoned to Rome by Julius II. to decorate the Vatican with painted windows, induced Marsillat to accompany him. Of the numerous windows which they must have painted only two remain in the church of Santa Maria del Popolo, so complete has been the destruction of painted windows in the Eternal City. Marsillat executed a number of magnificent windows in his manner for the cathedral of Arezzo. Marsillat, who painted well in oil and fresco, was the designer of his own windows. He was so impressed by the works of Michelangelo that he imitated his manner, and one of his windows at Arezzo, representing the *Raising of Lazarus*, is almost a transcript of the picture of the same subject designed by Michelangelo, and painted by Sabastian del Piombo, which is now in the National Gallery, London. The design of the Frenchman is rather more crowded, but is characterized by more life and action. He introduced into glass-painting the magnificent architectural backgrounds, with figures on balconies and terraces, made familiar by the works of Paul Veronese; he drew the human figure admirably, and was very successful in the representation of motion, and his arrangement of color was perfect in harmony. It is not to be wondered at that his works produced so great an effect upon the minds of his contemporaries.

Without entering upon the description of a considerable number of interesting works of glass painting in various parts of Italy, and of detailed notices of the art-

ists, enough has been done to illustrate the history and progress of the art from the thirteenth century to nearly the first half of the sixteenth. Later much less colored glass came to be used, and a considerable change in taste took place in this art as in architecture.

The technical execution of the glass paintings still existing in Italy resembles that prevalent elsewhere, and the method of the old masters is clearly described by Theophilus. The glass used was either pot metal or coated; that is, the color either pervades the whole body of the metal or is applied as a film over white glass, invariably the case with ruby, which would seem black but for this contrivance. The artist employed to design a window prepared a full-size working drawing, which, according to Theophilus, was executed on a whitewashed board in his time; but later these were made on paper. Guided by the firmly marked outlines, the glazier cut his mosaic of glass of the requisite colors by the aid of a hot iron, the diamond not being used for this purpose till the seventeenth century. The pieces of glass were further reduced to the shapes and sizes needed by the aid of the grozing iron, still a familiar instrument; thus prepared they were ready for the painter, and at the present time are attached to a transparent easel formed of a large sheet of glass. Theophilus thus describes the enamel color prepared for painting with:—"Take copper beaten small, burn it in a little pipkin until it is entirely pulverized, then take pieces of green glass and sapphire" (a blue paste used in mosaic work), "and pound them separately between two porphyry stones; mix these ingredients together in the proportions of one-third powder, one-third green glass, and one-third sapphire. Grind them on the same stone with wine or urine, put them into an iron or leaden vessel, and paint the glass with the utmost care. For with the three colors" (that is, shades of one color), "if you are diligent in the work, you can make the lights and shadows of the draperies in the same manner as in colored painting. When you have laid on the first touches in the drapery with the aforesaid color, spread it in such a manner that the glass may be pure" (that is, untouched) "in that part which you are accustomed to make light in a picture, and let the touches be dark in one place and light in another" (that is graduated), "and again yet lighter and distinguished with much care, that it may appear as if three shades of color had been applied. This order you should observe below the eyebrows, and round the eyes, and nostrils, and chin, round the naked feet and hands, and other portions of the naked body; and thus let the glass painting have the appearance of a painting composed of many colors." It must be obvious from this description of the most ancient method of glass painting, in important respects the same as that still followed, that the art is regulated by certain necessary conventions distinguishing it from painting upon opaque surfaces. The features and accessories are drawn with sharp black lines making them out clearly to be seen at a distance, and in a very different way from the representation of such details in a picture. The highest lights are the local color, that is, the pure color of the glass; the deepest shadows are solid black produced by laying on the enamel thickly; all this is precisely the reverse of the system pursued at the same early period in painting pictures in which the shadows were the local color and the lights white. As painting advanced it gradually approached more nearly to the scale of color of the glass-painter, the lights instead of being white were painted of appropriate shades of the local color, and the shadows were graduated into black in their deepest parts. It may have been that glass painting suggested this important change in ideas of color and chiaroscuro. The glass being painted as described



must be burnt to fix the enamel thereon with its flux. The separate pieces with the painted side upward are placed upon the shelves of a kiln or iron box, covered with whiting; the kiln is placed in a brick oven, and a fire kindled which surrounds it with flames. Much experience is needed to determine when the glass is sufficiently burnt to fix the enamel. When this has been done the fire is withdrawn, the oven is hermetically sealed, and the glass is left to cool gradually, so as to be annealed. From the appearance of many Italian windows as compared with those executed elsewhere, it is reasonable to infer that the Italians were less skillful than their northern contemporaries in firing their glass. The next process is to unite the numerous pieces of mosaic, thus painted and burnt, into panels of a given size, which is done by means of ribbons of lead grooved on both sides, the ribbons being soldered at all their angles, thus firmly tying the mosaic together. When the painted window is erected, the leads are seen internally in contrast with the transparent glass as intensely black lines, but externally, where they catch the light, as meandering lines of metal dividing the surface. Mistaken attempts have repeatedly been made to get rid of these lines, but they are constituent parts of the art, can only be got rid of by changing its true character, and are only disfiguring when injudiciously introduced, as for instance in some fourteenth-century glass in Santa Croce, in which the whites of the eyes are fixed with leads of the form of spectacles, so that all the saintly persons represented appear, ridiculously enough, to wear these aids to defective vision. The panels, which are technically called glazing panels, are inserted in their places in the windows by means of grooves prepared in the stonework, into which they are secured with cement and strengthened at intervals with cross-bars of iron called saddle-bars, to which the glass is made fast by ties of copper wire. Thus fixed, experience has shown that painted windows if duly cared for will last for many centuries. Regarded in their connection with past history, no monuments of art surpass painted windows in interest; they are only equaled by the paintings still extant in the tombs of the Egyptians as illustrations of faith, history, and customs. It was almost the universal usage that persons of every rank and position, as well as corporate bodies and guilds, made offerings of painted windows to churches. While they give the most vivid ideas of ancient taste and methods of decoration, the religious opinions of successive ages are interpreted by the manner in which sacred subjects are selected or represented; the actual state of art at different times, from its rudest forms to the most perfect, is admirably exemplified; and, as it was customary to introduce the donors in appropriate parts of their gifts, the prince or noble in knightly panoply, with his armorals, is seen kneeling, sometimes accompanied by his spouse.

GLASSCHORD, a musical instrument, with keys like a pianoforte, but with bars of glass instead of strings of wire. It was invented in Paris, in 1785, by a German called Beyer. The name glasschord was given to the instrument by Franklin.

GLASSIUS, SOLOMON (1593-1656), theologian and Biblical critic, was born at Sondershausen, in the principality of Schwarzburg-Sondershausen.

GLASS-PAPER, or CLOTH, is made by powdering glass more or less finely, and sprinkling it over paper or calico still wet with a coat of thin glue; the powdered glass adheres as it dries. Glass-paper is extensively employed as a means for polishing metal and wood-work.

GLASS SNAKE (*Ophisaurus*), a genus of lizards, belonging to the sub-order *Brevilingua*, family *Ptychopleuridae* (*Zonuridae*), and allied to the *Scincidae*.

There is only one known species, common in the United States; it is serpent-like in form, over three feet long, and is entirely destitute of limbs. The body and tail are marked with transverse lines of black, green, and yellow. It feeds on insects, mollusks, etc., and can neither climb nor swim. It is remarkable for the readiness with which the joints of the tail break off upon any irritation, the joints thrown off being soon reproduced. The caudal muscles do not pass from one joint to another, so that the breaking of the tail involves no rupture of muscular fibers, but only a separation of one muscular plate from another.

GLASTONBURY, a market town and municipal borough in England, is situated near the middle of Somersetshire, about twenty-two miles southwest of Bath, on the great western road from London to Exeter. The abbey of Glastonbury is without doubt one of the very earliest ecclesiastical foundations in England.

GLASSWORT (*Salicornia*), a genus of plants of the natural order *Chenopodiaceæ*, having uniform hermaphrodite flowers. One species (*S. herbacea*), a leafless plant with jointed stems, is common in salt marshes. It makes a good pickle, and is sometimes sold for this purpose. Several species grow abundantly on the shores of the Mediterranean; and as they contain a large quantity of soda, are used in making barilla, along with the species of saltwort.

GLATZ (Slav. *Kaldsko*), a fortified town of Prussian Silesia, chief town of a countship in the government district of Breslau. Population, 13,585.

GLAUBER, JOHANN RUDOLPH, alchemist and medicinal chemist, was born at Carlstadt in 1603, and died at Amsterdam in 1668.

GLAUBER'S SALT, the popular term for neutral sulphate of sodium, discovered by the chemist whose name it bears, and formerly known as "sal mirabile Glauberi." It occurs in nature in combination with calcium sulphate as the mineral glauberite, and uncombined in right rhombic prisms, as thenardite, being found in this form in Bolivia and Peru, and near Madrid; or in monoclinic prisms, with ten molecules of water as glauberite or ordinary Glauber's salt, in Austria, Hungary, Italy, and in great quantity as a deposit from the hot springs of Carlsbad. In medicine it is employed as a purgative.

GLAUCHAU, one of the most important manufacturing towns of Saxony, circle of Zwickau, is situated on the right bank of the Mulde, seven miles north of Zwickau and seventeen west of Chemnitz. While the population in 1834 was only 6,292, it was 14,357 in 1858 and 24,200 in 1889.

GLAUCUS (*Γλαυκός*, i.e., *γλαυκός*, "silvery" or "sheeny"), in Greek mythology, the name of several figures, the most important of which are the four described below:—

(1) GLAUCUS, surnamed Pontius (*ὁ πόντιος*, equivalent to *ὁ θαλάσσιος*), according to the common legend had originally been an expert fisherman and diver at Anthedon (Bœotia), but having eaten of the magical herb sown by Cronos, had leaped into the sea, where ultimately he was changed into a god, and endowed with the gift of unerring prophecy. He is generally represented as endowed with most of the attributes of Nereus, but occasionally he is identified with Melicertes. He is sometimes said to have instructed Apollo in prophecy. In art he is depicted as a vigorous old man with long hair and beard, his body terminating in a scaly tail. The *Argonautica* represent Glaucus as having been builder and steersman of the "Argo," as having alone remained unhurt in the fight of Jason with the Tyrrhenians, and as having afterward become a sea god, in which capacity he was able in various ways to assist the expedition.



(2) GLAUCUS, usually surnamed Potnieus (ὁ ποτνιαεύς), from Potniæ near Thebes, a deity worshiped chiefly in Corinth, is to be carefully distinguished from Glaucus Pontius. He was the son of Sisyphus by Metope, and the father of Bellerophon. According to the legend he was destroyed by his own mares, — the most common form of the story being that he was torn to pieces by them. Accounts differ as to the place of his violent leath, and also as to the immediate occasion of it. He is most frequently represented as having offended Aphroditē by having kept his mares from breeding; but other versions of the myth are that he had fed them on human flesh to make them more spirited, or they had been suffered to drink at a sacred well at Boeotia, or that they had eaten the herb hippomanes. His affinities with Poseidon Hippius are obvious; and it may be taken for granted that the frantic horses of Glaucus Pontnieus represent the stormy waves of the sea, just as Glaucus Pontius is himself a personification of the ocean in its friendlier and calmer moods.

(3) GLAUCUS, the son of Minos by Pasiphaë, when a child, playing at ball or pursuing a mouse, fell into a honey pot and was smothered. His father, after a vain search for him, consulted the oracle, and was referred for an answer to the person who should suggest the aptest comparison for one of the cows of Minos which had the power of assuming three different colors. Polyidus (Πολύιδος) of Argos, who had likened it to a mulberry (or bramble), which changes from white to red and then to black, soon afterward discovered the child. Minos then desired him to restore young Glaucus to life; and on his failure in this, he was sentenced to be entombed alive along with the corpse. Having in the sepulcher killed a serpent by which he had been attacked, he saw its companion revivify it by laying upon it a few leaves of a certain herb. The same herb he successfully applied to Glaucus. This curious myth is now very generally admitted to be of a solar character; but interpreters are far from unanimous as to the significance of the various details.

(4) GLAUCUS, son of Hippolochus, and grandson of Bellerophon, mythical progenitor of the kings of Ionia, was a Lycian prince who, along with his brother Sarpedon, assisted Priam in the Trojan war. The incident between Glaucus and Diomedes, as related in the *Iliad*, is well known.

GLEBE, in ecclesiastical law, is the land devoted to the maintenance of the incumbent of a church.

GLEE is a musical term for a part song of a particular kind. The word as well as the thing, are essentially confined to England. The technical meaning has been explained in different ways; but there is little doubt of its derivation from the Anglo-Saxon "gleov, gleo," delight, and hence *ludus musicus*. As to the word "glee," there are early examples of its being used as synonymous with harmony or concerted music. Glee in its present meaning signifies, broadly speaking, a piece of concerted vocal music, generally unaccompanied, and for male voices, though exceptions are found to the last two restrictions. The number of voices ought not to be less than three. As regards musical form, the glee is little distinguished from the catch, — the two terms being often used indiscriminately for the same song; but there is a distinct difference between it and the madrigal — one of the earliest forms of concerted music known in England.

The convivial character of the glee led in the last century to the formation of various societies, which offered prizes and medals for the best compositions of the kind, and assembled for social and artistic purposes.

The most famous among these — the Glee Club — was founded in 1783, and at first used to meet at the

house of Mr. R. Smith, in St. Paul's Churchyard. This club was dissolved in 1857. A similar society — the Catch Club — was formed in 1761, and is still in existence.

GLEIG, GEORGE, bishop of Brechin, Scotland, was the son of a farmer, and was born at Boghall, Kincardineshire, May 12, 1753. He died at Stirling in February, 1839.

GLEIM, JOHANN WILHELM LUDWIG, a minor German poet, was born April 2, 1719, near Halberstadt, and died there February 18, 1803, after having occupied during half a century the situation of secretary to the chapter of Halberstadt. "Father Gleim" was the title accorded to him throughout all literary Germany on account of his kind-hearted though inconsiderate and indiscriminating patronage alike of the poets and poetasters of the period.

GLEIWITZ, a town in the Prussian province of Silesia, chief town of the circle of Tost-Gleiwitz, government district of Oppeln, is situated on the Klodnitz, and on the railway between Oppeln and Cracow. The population in 1889 was 17,658.

GLENDOWER, or GLYNDWR OWEN, the last native who assumed the title of the Prince of Wales, and the leader of the only formidable attempt made by the Welsh to regain their freedom, after they had been subjugated by Edward I., was born most probably at Glyndwr in Montgomeryshire, whence his name, about the year 1354. He found his way to the English court, where he became a favorite with King Richard, and was made an esquire of his body. When Richard went to Ireland Owen accompanied him, as he did also on his return to Wales. He was present when Richard placed himself in the hands of the treacherous Northumberland, and at Flint, where his deposition was decided upon. Owen thereupon retired into private life. He had the misfortune to have for a neighbor Reginald de Grey, earl of Ruthin; and between him and De Grey a feud existed, occasioned by a dispute about a piece of waste land. In the time of Richard, Owen was successful in a lawsuit; but no sooner was the king deposed than De Grey took forcible possession of the land. Owen in vain appealed to parliament, although the bishop of St. Asaph entreated them to grant his request, and warned them that, if they did not, Wales would rise in rebellion; and a little later Henry IV., on the ground that Owen, as a crown tenant, had neglected to join an expedition to Scotland (while the fact was that the summons, which had been intrusted to De Grey to give to Owen, was not delivered until it was too late), declared a forfeiture of his land held by the crown, and granted some of it to De Grey. With armed retainers De Grey took possession; but Owen mustered his followers, and after regaining his own, devastated the lands of De Grey. Henry took De Grey's part, and Owen set both at defiance. On September 20, 1400, Owen struck the first blow for the freedom of his country at Ruthin, where a fair was being held. At a parliament held at Machynlleth, at the close of this year (1402), Owen was formally proclaimed Prince of Wales. For years he carried on a desultory warfare, but defections from his ranks so weakened his power that he was no longer the dangerous enemy he had been. But he never submitted. In July, 1415 — fifteen years after the first outbreak — the king, now Henry V., authorized Sir Gilbert Talbot to treat with Owen, and to offer him and his followers free pardon, "in case they should desire it." A similar offer was made in February, 1416. His death is believed to have taken place at the house of one of his daughters in Monmouthshire, but there is no certainty as to either the date or the place of his death.



**GLENS FALLS**, a town of Warren County, N. Y., on the Hudson river, with a population of (1890) 7,500. It takes its name from the falls of the river (50 feet high). It has ample railroad, bank and telegraph facilities, and some manufactures. It is steadily growing in population and commercial importance.

**GLEYSRE**, MARC CHARLES GABRIEL, a celebrated French painter, was of Swiss origin, having been born at Chevilly in the canton of Vaud, May 2, 1806. Mention is made of two decorative panels—*Diana Leaving the Bath*, and a *Young Nubian*—as almost the first fruits of his genius; but these did not attract public attention till long after, and the painting by which he practically opened his artistic career was the *Apocalyptic Vision of St. John*, sent to the Salon of 1840. This was followed in 1843 by *Evening*. After 1845, when he exhibited the *Separation of the Apostles*, he contributed nothing to the Salon except the *Dance of the Bacchantes*, in 1849. And yet he labored steadily and was abundantly productive. A long series of years intervened between the first conception of a piece and its embodiment, and years not unfrequently between the first and the final stage of the embodiment itself. It was while on a visit to the Retrospective Exhibition, opened on behalf of the exiles from Alsace and Lorraine, that he suddenly dropped down and expired May 5, 1874. He left unfinished the *Earthly Paradise*, a noble picture.

**GLINKA**, FEDOR NIKOLAEVICH, a Russian poet and author, was born at Smolensk in 1788, and died on his estates in 1849.

**GLINKA**, MICHAEL IVANOVICH, a celebrated Russian composer, was born at Novospassky, a village in the Smolensk government, in 1804. His training as a composer was finished under Dehn, the celebrated contrapuntist, with whom Glinka staid for several months at Berlin. He wrote and arranged several pieces for the orchestra, among which the so-called *Kamarinskaya* has achieved popularity beyond the limits of Russia. He also composed numerous songs and romances. In 1857 he went abroad for the third time, and died suddenly at Berlin, on February 14th of that year.

**GLINKA**, SERGY NIKOLAEVICH, Russian author, the elder brother of Fedor N. Glinka (noticed above), was born at Smolensk, in 1774, and died in 1847.

**GLOBE**. With the exception of illuminated portolani, the most interesting monuments of geography are globes. Celestial globes are much more ancient than terrestrial ones. The earliest of these with which we are acquainted is one made of copper engraved in the Arab-Cufic character of the eleventh century. It is preserved in the Bibliothèque Nationale de Paris. In Italy the emperor Frederick II. (1197-1250) possessed a celestial globe of gold, probably also of Arab manufacture, on which the stars were indicated by pearls; from the scanty information that has come down to us respecting it we should imagine that it partook somewhat of the nature of an armillary sphere, as representations of the planets were to be seen in the interior of it. To these succeed a series of globes ranging from the fifteenth to the seventeenth century.

One might suppose that many specimens of these globes would exist in public libraries, but diligent research has shown that the majority of those not made of metal are more perishable than maps, and much more so than books. The earliest terrestrial globe of any importance known to geographers is the well known one of Martin Behaim of Nuremberg, bearing the date of 1492. As a monument of geography it is of the highest importance, being the only original document that has come down to us in this form embodying the geographical views of its author with those of his gifted

contemporaries, Toscanelli, Columbus, etc. This globe represents with some slight modifications most of the disproportions of the Ptolemaic geography, into which is incorporated information evidently derived from the travels of Marco Polo and Sir J. Maundeville. It was executed by Behaim, assisted by Holtzschuer, while on a visit to his native city (1491-3), after a sojourn of five years at the Azores. It is still preserved in the house of his ancestors at Nuremberg.

In all probability the earliest post-Columbian globe extant is the one now preserved in the Lenox Library, New York. It was found in Paris some twenty-five years ago by Mr. Richard M. Hunt, who, upon learning its value, presented it to the Lenox Library, of which he is the architect. This globe is of copper, about four and one half inches in diameter and engraved. It is pierced for an axis, and probably, like the Laon sphere, formed the principal feature of an astronomical clock or armillary sphere. The date assigned to the Lenox globe by Mr. Henry Stevens, who first recognized its importance, and had an accurately drawn projection made of it in the Coast Survey Bureau at Washington in 1869, is about 1506-7. A comparison of that projection, now published in reduced fac simile for the first time, with several contemporary maps and globes, serves to show the accuracy of the date assigned to it, as also to suggest its French origin. The author is unknown.

The next globe that demands attention is the famous one made at Bamberg in 1520 by Johann Schöner, at the cost and charges of his friend Johann Sayler. It was afterward taken to Nuremberg by Schöner, where it is still preserved in the town library. The importance attached to this globe is that hitherto it has always been regarded as the first of its kind to portray the discoveries in the New World, in combination with the notions that had previously prevailed of the space intervening between Europe and Africa on one side, and the eastern ends of Asia on the other. Schöner in this globe breaks up America into as many islands as possible. Thus North America is shown as one large island. He also represents South America as a large island, to which he applies several names, among which we observe, for the first time on a globe, the name "America." North America was not comprised under the name until a later date. Schöner's globe indicates two great series of North American discoveries, of which one, commencing with the Cabots in 1497, extended by degrees to Canada and Nova Scotia, while the other, commencing with Columbus in 1492, advanced from the Bahamas slowly northward to Virginia and New England. Between these two points there remained a region more or less known which on this globe is indicated by open water. In depicting the east coast of Asia and the many islands there, including Japan and Java-major, the author follows the globe of Behaim. By some it has been regarded as a new edition of Behaim. There are in Germany several globes which depict the world nearly in the same manner as Schöner's. One, preserved in the city of Frankfort, bearing the same date (1520), is about ten and one-half inches in diameter, and has been produced by M. Jomard in his *Monuments de la Géographie*, pl. 15 and 16. There is also another in the library of the grand-duke of Weimar. As all these globes give to North and South America the configuration they have in Schöner, Humboldt was of opinion that they all are, with respect to America, copies of an older chart "hidden perhaps in the archives of Italy or Spain."

There is at Nancy a terrestrial globe which is also a geographical curiosity. It is of chased silver gilt, about six inches in diameter; the land portion are represented in fine gilding, the water in azure blue enamel. One of the hemispheres opens outwardly



horizontally, the interior being also gilt. It formerly served the purpose of a pyx on the altar of the church of Notre-Dame-de-Sion, to which church it was offered by Charles IV., duke of Lorraine, on his return in 1663. It is now preserved in the town library.

In 1541 the illustrious Gerard Mercator constructed and published at Louvain a terrestrial globe, and in 1551 a champion celestial globe. These are without doubt the most important monuments of the kind of the sixteenth century. They were to be found in nearly all the universities and libraries of Europe, in the private libraries of the rich, and the class-room of the teacher of navigation. Yet only two sets of the original globes are known now to exist in Europe—one in the royal library at Brussels, discovered in 1868, the other in the imperial court library at Vienna, discovered in 1875. These globes are about two feet high, and when first mounted on stands with all their accessories, meridians, horizons, etc., must have presented a noble appearance. They are only known to us by facsimiles of gores reproduced from the originals in their natural size, published at Brussels in 1875, with an introduction to their history by Dr. J. Van Raemdonck. A comparison of the terrestrial globe with all those that preceded it shows it to be a monument at once of learning and science, worthy of the greatest scientific geographer of his age. The authors used by Mercator in his configurations of the continents of the Old World were chiefly Ptolemy and Marco Polo. For representing the New World he evidently acquainted himself with the narratives of all the most recent voyages, maps, and charts that were to be had in his time. These were used with the greatest possible skill and discrimination; and in consequence we have the best delineation of the world on a globe that it was possible to produce at the period. In Mercator's time the imperfect knowledge of pilots in general, and the defects of their charts in plano, made terrestrial globes much more useful to navigators than we can well realize to-day. Convinced of their importance Mercator neglected nothing in order to adapt them to the use of seamen; he therefore added to his globes the rhumbs hitherto found only on plain charts. He added yet another improvement, delineating about thirty leading stars of the principal constellations according to their magnitudes and their positions in the heavens. These important improvements appear to be quite peculiar to the globes of Mercator.

An examination of the celestial globe of 1551 also reveals many improvements introduced by Mercator in his delineation of the heavens. Without counting a great number of stars as yet unresolved into symbolical groups, Mercator gives us 934 fixed stars, distributed in fifty-one constellations. Two of the latter are entirely new, and are not met with on later celestial globes. These are Antinous, formed of six stars on the equator below the Eagle, and Cincinnus, or the Lock of Hair, formed of one star and two nebulae in the north hemisphere, under the tail of the Great Bear.

*The Globe of Euphrosynus Ulpius of 1542.*—This globe, apparently made in Rome, is now preserved in the museum of the New York Historical Society. It is fifteen and a half inches in diameter, made of copper, and is divided into two hemispheres on the line of the equator, and fastened together with iron pins. The normal position of the globe in its stand being vertical, the north pole with its hour-circle is surmounted by an iron cross. It is encompassed by a horizon, upon which are engraved the signs of the zodiac. The height of the whole apparatus, with its stand of oak, is three feet eight inches.

The true successor of Mercator in the art of globe-

making was not J. F. Van Langren, Jodocus Hondius, or W. J. Blaeu, as has been supposed, but an Englishman named Emerie Mollineux, the friend of Hakluyt, and of John Davis of Arctic fame. The "coming out of the very large and most exact terrestrial globe" of Mollineux there referred to, with its companion celestial one, was accomplished in 1592. At the same time appeared a manual in English for their use, by Thomas Hood of Trinity College, Cambridge; and in 1594 appeared another manual, written expressly for them in Latin by Robert Hues, entitled *Tractatus de Globis et eorum usu*. Two years afterward this latter was translated by J. Hondius, and published in Amsterdam, giving rise to the notion, apparently still prevalent in Holland, that Hues wrote this book expressly for Hondius—a bibliographical blunder involving injustice to the memory of Mollineux. The only examples of these once famous globes known to exist are now preserved in the library of the Middle Temple, London. They are both two feet in diameter, mounted on stands, with the usual accessories of horizon, meridian, etc. The celestial globe still bears the date of 1592, but the terrestrial appears to have received additions, and the date has been altered by the pen to 1603.

In the Academy of Sciences at St. Petersburg there are or were four globes that call for notice. The first is a terrestrial one, three feet in diameter, made at Pleskow by a deacon named Karpow Maximow. It is supposed to have been the first made in Russia. Here is also preserved a large terrestrial globe of copper, made in 1664 by the heirs of W. J. Blaeu; it is seven feet in diameter, and was brought from Moscow about 1747. In the same academy is preserved the famous Gottorp globe; it is a hollow sphere eleven feet in diameter, containing a table and seats for twelve persons. It was made by A. Bush in 1654, under the direction of Olearius, from designs found among the papers of Tycho Brahe, and was not finished until 1664.

The two largest complete globes existing are those preserved in the "Salle des Globes" in the Bibliothèque Nationale of Paris. They are each twelve feet in diameter, and were made under the direction of the famous Italian geographer Coronelli, in 1683, by order of Cardinal d'Éstrées, the Spanish Ambassador, and presented by him to Louis XIV. They are made of wood, very solid, and are covered with cloth or canvas on which the configurations have been drawn by an able artist, particularly those on the celestial globe.

About 1764 Dr. Roger Long of Cambridge, professor of astronomy and master of Pembroke, erected in an outbuilding of his hall a sphere eighteen feet in diameter. The concave interior was lined with tin, upon which were depicted all the stars and constellations visible in England on the horizon of Cambridge. To these succeed in order of size the globes known as "Georamas." One exhibited in Paris in 1844 was thirty feet in diameter; another by Delanhard, erected in 1823, was forty feet in diameter; of the last the proprietor published a description. Then follows Wyld's well-known "great globe," erected in Leicester Square, London, sixty feet in diameter. The largest appears to have been the one erected by Colonel Langlois in Paris in 1825, on the Champs Élysées. This was 120 feet in diameter. As has been truly said, these structures served more to satisfy curiosity than to impart scientific instruction.

The manufacture of artificial globes has changed but little in character during the last hundred years. Such improvements as have been introduced have reference either to the quality of the maps or to the mode of mounting the globes. The number of sizes manufactured has also been increased. The diameter has always



been used to indicate the size of the globes, and those now produced by the various makers vary from one to thirty-six inches.

The process of manufacture differs little if at all in the sizes of globes ranging between three and twenty-five inches. Thus supposing, for example, a twelve-inch globe (the ordinary school globe) is required to be made, a spherical mold measuring some quarter of an inch less in diameter, is prepared on which to form hemispherical caps that are to constitute a hollow foundation for the globe. This mold, made preferably hollow for lightness, and having a central axle terminating in poles, is well greased on the surface to enable it to resist damp. To form the caps, strips of white paper, damped in water, are first applied to the mold to form a coating thereon. Upon this coating is applied brown paper saturated with paste, and alternate layers of white and brown paper are added, until the required thickness of paper, say one-sixteenth of an inch, is obtained. The change of color is adopted simply as a guide to the workman, that he may know when he has completed a coating of paper. The mold thus covered is put aside to dry, and, after two or three days, the paper covering is severed into two hemispherical caps, which are then drawn off from the mold.

A wooden axle furnished with poles (which will eventually form the north and south poles of the globe) is of such a length as will enable the caps, when fitted over the poles, to meet at their severed edges. By means of glue these edges are joined up, and the caps are firmly attached to the ends of the axle. Thus a hollow sphere of rude outline is formed, measuring somewhat less than twelve inches in diameter. The next operation is to bring this sphere to the required diameter for the globe, and to make it perfectly true. For this purpose the ball is coated with a plastic composition of whiting, boiled oil, and glue, and passed under the action of a steel semicircle fitted with bearings for receiving the poles of the ball, and retaining the same in place while the ball is being slowly rotated. By applying to the ball repeated coatings of this composition, and removing all superfluities by means of the gauging edge of this steel semicircle, a smooth spherical surface is eventually obtained. When the ball is finished and hard, it is tested in loose bearings to see whether it will remain quiescent in all positions. If it shows a tendency to run round, the ball is balanced by the introduction of a counterweight at the highest part of its periphery. When the ball is balanced, and the hole made good by which the counterweight was introduced, the surface is polished, after which it is ready to receive the map. For twelve-inch globes the maps of the earth and of the heavens are engraved on steel or copper plates in twelve gores, measuring each thirty degrees in width, and extending from pole to pole, or more usually to the seventieth degree of latitude, the remaining portion of the maps being made up by north and south pole plates. This arrangement is somewhat modified for larger globes. Thus, for globes above fifteen inches in diameter, the gores are divided in the line of the equator, and they are also divided longitudinally for say one-fourth of their length at the fifteenth degree, in order to facilitate the laying down of the maps evenly upon the spherical surface. Preparatory to covering the sphere with the map; it is marked with lines corresponding to the equator, parallels of latitude, and lines of longitude on the map, such lines serving as a guide for the workman. The gores of the map having been carefully cut out, they are damped and laid down in proper order in a pile upon a pasting board. The workman then covers his polished ball, for the length and breadth of a gore, with paste, or, more properly, a preparation of starch, and having coated with

starch the uppermost gore of the pile, he with an ivory knife lifts that gore, and lays it upon the pasted portion of the ball, fitting it to the lines marked thereon, and smoothing down creases, at the same time taking care that the latitude and longitude lines of the gore correspond exactly with the lines on the ball. Having laid down this gore in place, he next applies a second gore in like manner, taking care that the two gores shall join each other, and not expose any portion of the underlying surface. In this way the workman proceeds until all the gores are in place, and he finishes the pasting of the ball by applying the pole papers which fit respectively on to the opposite ends of the gores. The map has next to be sized, preparatory to its being colored, in order to form a resist to the varnish which is subsequently to be applied to the globe. The map is tinted and outlined with water colors, and a coat of varnish is then applied. When this is dry the globe is ready for mounting: after which the varnishing operation is completed by the application in a heated room of several coats of spirit varnish following quickly the one on the other. Some skill is requisite in laying on the varnish, so as to obtain a surface as clear and smooth as glass. This result is unfortunately evanescent, as the best varnish is liable to discolor and to crack, and thereby obscure, to some extent, the legibility of the underlying map. After varnishing the globe will be fit to handle in from four to six days. For the purpose of mounting the globe, a flat ring, termed the brazen meridian, is provided, and bearings are formed thereon to receive the poles of the globe. This ring is divided on its face into 360 degrees, the numbering of these degrees being from 0 (which corresponds with the equator) to 90 at the poles on one half of the ring, and on the other half the numbering starts from the poles at 0, running up to 90, which corresponds with the equator. Fitted to the poles, and capable of turning thereon, are hour circles, which underlie the brazen meridian, and are divided and numbered to correspond with the twenty-four hours of the day and night. The frame for the reception of the globe and ring is formed with a wooden horizon, which constitutes an imaginary line dividing the globe into two equal parts, the portion above the horizon being the visible half, and that below the horizon the invisible half of the sphere. This horizon is covered, like the globe, with papers which are varnished to protect them from injury. The horizon papers near their inner edge are divided into 360 degrees, by which are reckoned the azimuth and the amplitude; they also indicate the points of the compass in the space called the circle of the winds. The horizon of the frame is notched to receive the brass meridian, which rests in a step-bearing fitted to the central pillar or block of the frame, and is held therein by a screw stop, which, entering an annular groove in the back of the meridian, leaves the ring free to turn round in the frame, for the purpose of rectifying the globe, or bringing its axis to any desired angle with the horizon. The fitting of the globe is completed by the quadrant of altitude, consisting of a thin flexible slip of brass, jointed to a clamping nut, which is intended to embrace the brass meridian, and may be adjusted thereon by a tightening screw. This flexible slip or blade is divided off into ninety degrees, corresponding to those on the equator, and is intended to measure distances between any two places upon the curved surface of the earth, or the altitude of the sun, a star, or any planetary body in the heavens, and for this purpose its graduations are numbered from 0 to 90. A useful appendage to the globe frame is a mariner's compass, which facilitates the adjustment of the globes to their true solar position.

GLOBE-FISH or SEA-HEDGEHOG. By these names



some sea-fishes are known, which have the remarkable faculty of inflating their stomachs with air. They belong to the genera *Diodon* and *Tetrodon*. Their jaws resemble the sharp beak of a parrot, the bones and teeth being coalesced into one mass with a sharp edge. In the Diodonts there is no mesial division of the jaws, while in the Tetrodons such a division exists, so that they appear to have two teeth above and below. By means of these jaws they are able to break off branches of corals, and to masticate other hard substances on which they feed. Usually they are of a short, thick, cylindrical shape, with powerful fins. Their body is covered with thick skin, without scales, but provided with variously formed spines, the size and extent of which vary in the different species. When they inflate their capacious stomachs with air, they assume a globular form, and the spines protrude, forming a more or less formidable defensive armor. A fish thus blown out turns over and floats belly upward, driving before the wind and waves. Many of these fishes are highly poisonous when eaten, and fatal accidents have occurred from this cause. It appears that they acquire poisonous qualities from their food, which frequently consists of decomposing or poisonous animal matter, such as would impart, and often does impart, similar deleterious qualities to other fish. They are most numerous between the tropics and in the seas contiguous to them, but a few species live in large rivers, as, for instance, the *Tetrodon fahaka*, a fish well known to all travelers on the Nile. Nearly 100 different species are known.

GLOBIGERINA. See FORAMINIFERA.

GLOGAU (sometimes called Gross or Great Glogau, to distinguish it from Klein or Little Glogau, in the government of Oppeln) is a fortified town of Prussia at the head of a circle in the Lower Silesian government of Liegnitz, situated partly on an island and partly on the left bank of the Oder, about eighty miles southeast of Frankfort. Population (1890), 20,028.

GLOSS, GLOSSOGRAPHER, GLOSSARY, GLOSSATOR.—The Greek word *γλῶσσα* (*glōssa*) meaning originally a tongue, hence a language or dialect, gradually came to denote especially any obsolete, foreign, provincial, technical, or otherwise peculiar word or use of a word; and the making of collections and explanations of such *γλῶσσαι* (*glōssai*) was at a comparatively early date a well-recognized form of literary activity. It was not, however, until the Alexandrian period that the *γλωσσογράφοι* (*glossographeis*) became very numerous. Of many of these it is probable that even the names have perished; but in the writings of Athenæus alone (c. 250 A.D.) allusions are to be found to no fewer than thirty-five. Among the earliest may be mentioned Philetas of Cos (d. c. 290 B.C.), the elegiac poet. He was the compiler of a lexicographical work. Next came his disciple, Zenodotus, of Ephesus (c. 280 B.C.), one of the earliest of the Homeric critics, and the compiler of *Γλῶσσαι Ὅμηρικαί* (*Glōssai Homerikai*). Zenodotus in turn was succeeded by his greater pupil, Aristophanes, of Byzantium (c. 200 B.C.). From the school of Aristophanes issued more than one glossographer of name—Diodorus, Artemidorus, Nicander, of Colophon; and Aristarchus, the famous critic, whose numerous labors included an arrangement of the Homeric vocabulary in the order of the books. Contemporary with the last named was Crates, of Mallos, who, besides making some new contributions to Greek lexicography and dialectology, was the first to create at Rome a taste for similar investigations in connection with the Latin idioms. Coming down to the beginning of the first century of the Christian era, we find Apion, a grammarian and rhetorician at Rome, during the reigns of Tiberius and Claudius, following up the labors of

Aristarchus and other predecessors. Heliodorus, or Herodorus, was another almost contemporary glossographer; Erotian, also, during the reign of Nero, prepared a special glossary for the writings of Hippocrates, still preserved. In the following century one of the most prominent workers in this department of literature was Ælius Herodianus. To the fourth century belongs Ammonius, of Alexandria (c. 389), who wrote a dictionary of words used in senses different from those in which they had been employed by older and approved writers. Of somewhat later date is the well-known Hesychius, whose often-edited *Lexicon* rightly superseded all previous works of the kind; Cyril, the celebrated patriarch of Alexandria, also contributed somewhat to the advancement of glossography; the names of Orus and Orion, of Philoxenus, and of the two Phileons, also belong to this period. In Latin lexicology the most prominent name is that of Festus, whose only extant work, however, is but an epitome of the treatise of Verrius Flaccus *De Verborum Significatu*. This last-named author had himself been preceded by Varro, who in turn makes allusion to several before him. The introduction of grammatical and linguistic studies into Rome is usually attributed to Crates, of Mallos (c. 267 B.C.), mentioned above.

To a special category of technical glossaries belongs a large and important class of works relating to the law—compilations of Justinian. Although the emperor forbade, under severe penalties, all commentaries on his legislation, yet indices and references, as well as translations and paraphrases, were expressly permitted, and lavishly produced.

In Italy, also, during the period of the Byzantine ascendancy, various glossæ and scholia on the Justinian code were produced; particularly the Turin gloss, to which, apart from later additions, a date prior to 1000 is usually assigned. After the total extinction of the Byzantine authority in the West the study of law became one of the free arts, and numerous schools for its cultivation were instituted. Among the earliest of these was that of Bologna, where Pepo (1075) and Irnerius (1100–1118) began to give their expositions. They had a numerous following, who, besides delivering exegetical lectures, also wrote Glossæ, first interlinear, afterward marginal.

With the decay of learning and originality during the dark ages grew the necessity for making and the custom of transcribing on manuscript copies of the Vulgate various notes, explanatory or otherwise, of the text. Ultimately collections of these glosses or sets of glosses came to be made. They are distinguished as either marginal or interlinear. The most famous collection of *Glossæ marginales* was that made by Walafridus Strabus in the ninth century; it consists of notes grammatical, historical, and theological, culled from the writings of Augustine, Ambrose, Jerome, Gregory, Isidore, Bede, Alcuin, and Hrabanus Maurus, with additions by himself. The interlinear glosses (which as a rule were not so full as the marginal) were sometimes theological but more generally purely philological.

GLOSSOP, a municipal borough of Derbyshire, is situated on the extreme northern border of the county, fourteen miles east-southeast of Manchester. It is the chief seat of the cotton manufacture in Derbyshire, and it has also woolen and paper mills, dye and print works, and bleaching greens. Population, 19,574.

GLOUCESTER, a county in the west midland district of England, bounded on the north by Worcester and Warwick, on the south by Somerset, on the east by Oxford and Wilts, and on the west by Hereford and Monmouth. The river Wye forms the western boundary line, the Stratford Avon part of the northern, the



Bristol Avon the southwestern, and the Thames for some miles the southeastern. The shape of the county is irregularly elliptical, its greatest length in direct line from Bristol to Clifford Chambers (northeast) being fifty-four miles, its greatest width from Down Ampney to Preston, near Ledbury, at right angles, thirty-three miles. The area, according to the tithe surveys—deducting 3,000 acres of detached land incorporated by an Act of 1844 with the counties of Worcester, Warwick, and Wilts, by which they were surrounded, and 17,688 acres of water—amounts to 805,102 acres, mostly cultivated. The county has three natural divisions, the hill, the vale, and the forest, parallel to each other north and south.

In the soil of the hill country is so much lime that a liberal supply of manure is required. This is provided by folding sheep and by paring and burning the turf and strewing the ashes on the surface. Good crops of barley and oats are thus obtained, and even of wheat, if the soil is mixed with clay. But the poorest land of the hill country affords excellent pasturage for sheep, the staple commodity of the district; and the sainfoin, which grows wild, yields abundantly under cultivation. The Coteswolds have been famous for the breed of sheep named from them since the early part of the fifteenth century—a breed hardy and prolific, with lambs that quickly put on fleece, and become attuned to the bracing cold of the hills, where vegetation is a month later than in the vale. Improved of late years by judicious crossing with the Leicester sheep, the modern Cotswold has attained high perfection of weight, shape, fleece and quality.

GLOUCESTER, the capital city of the county named after it, 106 miles from London by road and 114 by railway, derives its name from the British *Caer-Gloui*, near which at Kingsholm the Romans formed their camp of *Glevum*, vestiges of which remain in our principal streets running north, south, east and west, and crossing at the center, as well as in Roman pavements, altars, coins and pottery. A Roman station under Aulus Plautius, it became a city of Mercia, by name *Gleauanceastre*, under the Saxons, and is named by Bede as one of the noblest cities in the land. A monastery was founded here in 679, in which in 1022 Bishop Wulstan of Worcester established the Benedictine rule. In the eighth century the city was repeatedly ravaged and burnt by the Danish invaders, and endured ruinous conflicts up to the time of the settlement between Canute and Edmund Ironside. The abbey throve from the time of Canute, the foundations of the present church having been laid by Abbot Serlo (1072–1104), and Walter Frocester, its historian, becoming its first mitred abbot in 1381. Edward the Confessor often resided at Gloucester, and it was a favorite resort of the Norman kings, of whom Henry I. met his death from a surfeit of lampreys, for which he acquired a taste there. Henry II. held a great council there, and Henry III. was crowned in the abbey, and “loved Gloucester better than London.” The “statutes of Gloucester” were passed in parliaments held there in succeeding reigns; but the tide of royal favor experienced an ebb when Charles I. subjected the city, garrisoned by the Parliamentarians, to a critical siege, which was eventually raised in September, 1643, by the earl of Essex. The cathedral may be succinctly described as “a Norman carcase,” altered by additions in every style of Gothic architecture.

Gloucester is situated on a gentle eminence overlooking the Severn, and sheltered by the Coteswolds on the east, while the Malverns rise prominently to the west. The principal public buildings are the shire hall, the town hall or Tolsey (occupying the site of the ancient

Roman capitol), the county jail and penitentiary, the East-gate market, the corn market, the infirmary, the lunatic asylum, and the hospital erected in 1861 in place of the four old almshouses. There are fourteen churches and several dissenting chapels, and it may have been the olden proverb, “as sure as God’s in Gloucester,” which provoked Oliver Cromwell to declare that the city had “more churches than godliness.” The city was chartered by Richard III., and is now governed by a mayor, six aldermen and eighteen burgesses. Its ancient industries were iron-founding, cloth-making, pin-making and bell-founding, but the last two have been for some time discontinued. It now possesses iron and brass foundries, marble and slate works, chemical works, soap works, rope works, flour mills, manufactories of engines, machines and agricultural instruments, and boat and ship-building yards. The population of the municipal and parliamentary borough in 1861 was 16,512; that of the municipal borough in 1871 was 18,330, and of the parliamentary borough in 1889 was 38,000.

GLOUCESTER, a city and port of entry of Essex county, Mass., is beautifully situated near the southern extremity of the peninsula of Cape Ann, thirty miles north-northeast of Boston by rail. It includes six villages—Gloucester village, East Gloucester, West Gloucester, Annisquam, Bay View, and Lanesville. The harbor, opening out into Massachusetts bay, is one of the best on the coast, and is defended by a fort. The prosperity of Gloucester depends mainly on its cod and mackerel fisheries. Steamers ply daily between the city and Boston. There are a number of manufactories connected chiefly with the fisheries, and in the neighborhood there are extensive granite quarries. Gloucester possesses a fine city hall, a high school, grammar schools, and a free library. On account of its attractive situation, and the fine scenery of the neighborhood, it is a favorite summer residence. About two miles from it is Norman’s Woe, the scene of the wreck of the *Hesperus*, celebrated in Longfellow’s poem. Population (1890), 24,651.

GLOUCESTER, a banking, railroad and telegraph town of Camden county, N. J. It has of late years had a steady growth, both in population and commercial interest. Present population (1890 census), 6,563.

GLOUCESTER POINT, the extreme point of Gloucester county, Va., opposite Yorktown, notable as the scene of important military operations during the siege of Yorktown (where Cornwallis surrendered, ending the Revolutionary War) and also during the advance made against Richmond by General McClellan in the late Civil War. The nearest banking town is Richmond.

GLOUCESTER, ROBERT OF. See ROBERT OF GLOUCESTER.

GLOVE (Saxon *glof*), a covering for the hand, with a separate sheath for each finger. Among our ancestors, to throw down the glove or gauntlet was equivalent to a challenge to single combat, and the person thus defied signified his acceptance of the challenge by taking up the glove, and casting down his own—which ceremony was regarded as a mutual compact to meet at the time and place specified.

The manufacture of gloves was early introduced into the British Islands, and such was the dignity of the craft that, as early as the reign of King Robert III., the incorporation of gloves of Perth was chartered—a wealthy guild still existing, although the calling has long ceased to characterize that town. The glovers’ company of London received its armorial bearings as early as 1464, but the body was not chartered till 1638; and in Worcester, which has long been the principal British



center of the trade, a company was incorporated in 1661.

The glove industry of the present day is both extensive and diversified, seeing that gloves are now almost universally worn, and made of various classes of material and in several different ways. Of yarn, thread, silk and cloth gloves it is unnecessary to speak, as these varieties are, in comparison with leather gloves, of comparatively little importance. The leather employed by glovers is prepared from the skins of deer, sheep and lambs, goats and kids—the last being by far the most important. The skins are prepared either by the ordinary processes of shamoying for wash-leather and doe or buck leather gloves, or by a special method of tawing in the case of ordinary dress gloves. The kid-skins are principally collected by hawkers in the South European countries, and sold in the Leipsic and Naples fairs. The tawing industry is conducted on a great scale at Annonay, Paris, and Milhau in France. The tawing process differs from ordinary tanning in the greater care and cleanliness of all the operations, in the submission of the dressed skins to a brief fermentation by piling them under the influence of heat, which increases the softness and flexibility of the leather, and in tawing with a mixture of flour, the yellow of eggs, and alum. On the completion of this operation, they are stretched by hand and dried as rapidly as possible. Thereafter they are damped, placed in dozens between linen cloths, and worked about to render them soft and pliable, after which they are planed on the flesh side, dried, and again planed. They are then polished by rubbing with a heavy glass disk or other smooth substance, and dyed by brushing liquid dyes over one side. Finally they are stretched on a marble table, and smoothed with a blunt knife. From a kid skin so prepared the materials of three gloves are obtained. The skins are moistened and stretched, and the various parts are cut out by a machine having steel punches the shape and size desired. The thumb piece, the quirks and the fourchettes inserted between the fingers, and the wrist welt—the latter frequently white—are cut out separately. Machine sewing, in which a kind of button stitch is made, is to a small extent utilized in the manufacture of gloves; but the greater part of the sewing is done by hand. The pieces to be sewed together are placed in a machine between a pair of jaws, the holding edge of which is composed of fine saw teeth, between each of which the sewer passes back and forward her needle, and in this way a neat uniform stitch is secured. There are three kinds of hand-sewing in the glove trade—round sewing or ordinary glove stitch, piqué stitch, and prick seam. After sewing, the backs are stitched or tamboured, the button-hole is formed, the wrist attached, and the button sewed on, thus finishing the glove. After damping and stretching to its utmost length, the glove is ready to be stamped and put up for use.

GLOVER, RICHARD, an English poet, was born in 1712, and died in 1785. He wrote several tragedies, and was one of the reputed authors of *Junius*.

GLOVERSVILLE, a manufacturing town of Fulton county, N. Y., noted for its glove production—being the principal source of supply in the Union. It has railroad, banking and telegraph facilities, and a population, in 1890, of 13,864. The city has six schools, costing \$75,000; twelve churches, and a free library, with 9,000 volumes. It is lighted by gas and electricity, well supplied with water, and has five miles of horse railroad. There is a volunteer fire department of seventy-five men, and a paid police department. The city receipts (1889) were \$31,000; city tax, 70 cents on the \$100; assessed valuation, \$3,800,000.

GLOW-WORM. See COLEOPTERA.

GLUCINUM, or BERYLLIUM (Greek γλυκύς, glykys, sweet, from the taste of its salts,) is a metal related most nearly in its physical properties to zinc and mercury, symbol G, atomic weight 9.3. Glucinum was first obtained by Wöhler and Bussy, in 1828, in an impure pulverulent form, by the fusion of its chloride with potassium; and by Debray, in 1854, in the compact state, by the decomposition in an atmosphere of hydrogen of the vapor of the chloride by that of sodium. Heated in air the metal oxidizes superficially, or, if in a state of fine division, burns with brilliancy. The spark-spectrum of glucinum presents two brilliant blue lines. Glucinum may be estimated in minerals, after removal of their silica, in the insoluble form or as fluoride.

GLUCK (not, as frequently spelt, GLÜCK), CHRISTOPHER WILLIBALD), a celebrated operatic composer, was born at Heidenwang, near Neumarkt, in the Upper Palatinate, on July 2, 1714, and died in 1787.

The most notable event in connection with Gluck is, perhaps, the contest which the appearance of his music—notably the opera *Iphigénie*—engendered among the French litterati, in regard to the comparative merits of his productions and the music of the Italians. The victory was, by common consent, declared to be with Gluck. His works were numerous, and nearly uniformly successful, the most celebrated being, perhaps, *Orpheus and Eurydice* and *Iphigénie*.

GLÜCKSTADT, a town of Prussia, in the province of Schleswig-Holstein, is situated on the right bank of the Elbe, where it receives the small river Rhin, and on the railway from Itzehoe to Elmshorn, twenty-eight miles northwest of Altona. Population, 5,600.

GLUCOSE (or, more correctly, GLYCOSE), known also as GRAPE SUGAR, STARCH SUGAR, and DIABETIC SUGAR ( $C_6H_{12}O_6 + 2H_2O$ ), seldom occurs in distinct, well-formed crystals, but may be obtained in warty concretions, which, when examined under the microscope, are found to consist of minute rhombic tablets. It is less sweet than ordinary (cane) sugar, and is soluble in water and in dilute alcohol. The two chief varieties are distinguished by their action on polarized light—dextro-glucose, which turns the plane of polarization to the right, and lævoglucose, which turns it to the left. Glucose is a constituent of the juice of grapes, plums, cherries, figs, and many other sweet fruits, and may often be observed in a crystalline form on raisins, dried figs, etc. It also occurs in honey. The simplest method of preparing pure glucose is by treating honey with cold rectified spirit, which extracts the uncrystallizable sugar; the residue is dissolved in water, and the solution is decolorized with animal charcoal, and allowed to crystallize. It is manufactured on a large scale from starch, obtained from corn.

GLUE. See GELATIN.

GLUKHOFF, or GLUCHOW, as the name is transliterated in German, a town of Russia, at the head of a district in the government of Tchernigoff, 132 miles east of Tchernigoff, on the highway between Moscow and Kieff. Population (1890), 15,000.

GLUTEN, a tough, tenacious, ductile, somewhat elastic, nearly tasteless and grayish-yellow albuminous substance, obtained from the flour of wheat by washing in water, in which it is insoluble. In Martin's apparatus for the preparation of gluten on the large scale, balls of dough are worked backward and forward in troughs by means of cylinders, while water plays upon them in fine jets delivered by copper pipes. A sack of flour may be thus made to yield about 110 pounds of moist gluten, and twice that quantity of dry starch. Good samples of white English wheat contain some 10 or 11 per cent. of gluten; from hard Venezuela wheat as



much as 22.75 per cent. has been procured. The outer and inner coats of wheat, separated from it as bran, contain respectively 4 or 5 and 14 to 20 per cent. of gluten. Gluten, when dried, loses about two-thirds of its weight, becoming brittle and semi-transparent; when strongly heated it crackles and swells, and burns like feather or horn.

GLUTTON, or WOLVERENE, a carnivorous mammal belonging to the *Mustelidæ* or weasel family, but differing from the typical forms of the genus *Mustela* in the greater heaviness and clumsiness of its body, presenting in this respect a striking resemblance to the bear. Its legs are short and stout, with large feet, the toes of which terminate in strong, sharp claws, considerably curved. Its mode of progression is semi-plantigrade. In size and form it is not unlike the European badger, measuring from two to three feet in length, exclusive of the thick bushy tail, which is about eight inches long. Its head is broad, its eyes small, with defective vision, and its back arched. Its fur consists of an undergrowth of short woolly hair, mixed with long straight hairs, to the abundance and length of which on the sides and tail the creature owes its shaggy appearance. The color of its fur is blackish-brown, with a broad band of chestnut color stretching from the shoulders along each side of the body, the two meeting near the root of the tail; while, unlike the majority of arctic animals, the fur of the glutton in winter-time grows darker in color. Like other weasels it is provided with anal glands, which secrete a yellowish fluid possessing a highly foetid odor. The glutton is a boreal animal, inhabiting the northern regions of both hemispheres, but most abundant in the circumpolar area of the New World, where it occurs throughout the British provinces and Alaska, being specially numerous in the neighborhood of the Mackenzie river, and extending southward as far as New York and the Rocky Mountains. Many erroneous statements have been made regarding the glutton by early writers on natural history, from Olaus Magnus to Buffon, one of which has perpetuated itself in the animal's common name,—the fact being that the wolverene is not more gluttonous than are the majority of carnivorous animals. It feeds on grouse and the smaller rodents, and on foxes, which it digs from their burrows during the breeding season. Its want of activity, however, renders it dependent for most of its food on the dead carcasses of animals. These it frequently obtains by methods which have made it peculiarly obnoxious to the hunter and trapper. Should the hunter, after succeeding in killing his game, leave the carcass insufficiently protected for more than a single night, the glutton, whose fear of snares is sufficient to prevent him from touching it during the first night, will, if possible, get at and devour what he can of it on the second, hiding the remainder beneath the snow. He annoys the trapper by following up his lines of marten traps, which often extend to a length of forty or fifty miles, each of which he enters from behind, extracting the bait, pulling up the traps, and devouring or concealing the entrapped martens. So persistent is the glutton in this practice, when once it discovers a line of traps, that its extermination along the trapper's route is a necessary preliminary to the successful prosecution of his business. This is, however, no easy task, as the glutton is too cunning to be caught by the methods successfully employed on the other members of the weasel family. The trap generally used for this purpose is one made to resemble a cache, or hidden store of food, such as the Indians and hunters are in the habit of forming, the discovery and rifling of which is one of the glutton's most congenial occupations,—the bait, instead of being paraded as in most traps, being in this

case carefully concealed, to lull the knowing beast's suspicions. One of the most prominent characteristics of the wolverine is its propensity, akin to that of certain members of the crow family, to steal and hide things, not merely food which it might afterward need, or traps which it regards as personal enemies, but articles which cannot possibly have any interest for it except that of curiosity.

The cunning it displays in unraveling the oftentimes complicated snares set for it forms at once the admiration and the despair of every trapper, while its great strength and ferocity render it a dangerous antagonist to animals much larger than itself, and occasionally even to man. The rutting season occurs in March, and the female, secure in her burrow, produces her young—four or five at a birth—in June or July. In defense of these she is exceedingly bold, and the Indians, according to Cowes, "have been heard to say that they would sooner encounter a she bear with her cubs than a carcajou (the Indian name of the glutton) under the same circumstances." The wolverene has a curious habit which has not hitherto been observed in any other of the lower animals. On catching sight of its relentless human enemy, it may be observed, before finally determining on flight, sitting on its haunches, and, in order to get a clearer view of the danger, shading its eyes with one of its forepaws. When pressed for food it becomes fearless, and has then been known to come on board an ice-bound vessel, and in presence of the crew to seize on a canister of meat. The flesh of the glutton is uneatable; it is therefore only valuable for its fur, which, when several skins are sewed together, forms elegant hearth and carriage rugs.

GLYCAS, MICHAEL, a Byzantine historian, often called Siculus. The time when he flourished is very uncertain. He is justly reckoned among the better Byzantine historians on account of the terseness and perspicuity of his style.

GLYCERIN, GLYCERINE, or GLYCEROL (in pharmacy GLYCERINUM), a sugar-like substance obtainable from most natural fatty bodies by the action of alkalies and similar reagents, whereby the fats are decomposed, water being taken up, and glycerin being formed together with the alkaline salt of some particular acid (varying with the nature of the fat). Owing to their possession of this common property, these natural fatty bodies and various artificial derivatives of glycerin, which behave in the same way when treated with alkalies, are known as *glycerides*. This decomposition into an organic acid and a substance of more or less neutral character is a typical kind of reaction with numerous classes of organic bodies, and is termed *saponification*, from the circumstance that the ordinary process of soap-making consists simply in the formation from natural fatty bodies and alkalies of the alkaline salts of the fatty acids thence derivable, soap being a mixture of these alkaline salts in various proportions, according to the particular purposes for which it is required, and its price. In the ordinary process of soap-making the complementary product, glycerin, remains dissolved in the aqueous liquors from which the soap is separated, and is usually thrown away; in many other instances, however, in which a substance capable of undergoing a reaction of saponification is thus treated, the product complementary to the alkaline salt is the more important of the two.

The fact that soap is obtainable by boiling together oily or fatty substances and alkalies (such as potashies and natron or mineral alkali) was known at an early period of history, being mentioned by Pliny, Galen, Aëtius, and Paulus Ægineta. On the other hand, substances referred to in the Old Testament and translated "soap" refer to the alkali itself and not to the substances prepared from oily bodies and these alkaline matters.



The discovery of glycerin, however, is of modern origin, the body having been first described in 1776 by Scheele under the name of oelsüss, and more fully investigated subsequently by Chevreul, Berthelot, and many other chemists, from whose researches it results that glycerin is a trihydric alcohol, the natural fats and oils, and the glycerides generally, being substances of the nature of compound ethers formed from glycerin by the replacement of the hydrogen of the OH groups by the radicals of certain acids, called for that reason "fatty acids."

Glycerin is also a product of certain kinds of fermentation, especially of the alcoholic fermentation of sugar; thus it is a constituent of many wines and other fermented liquors, being formed together with small quantities of various other substances by reactions subsidiary only to the main change taking place, and hence varying in their nature and extent with circumstances. According to Pasteur, about one-thirtieth of the sugar transformed under ordinary conditions in the fermentation of grape juice and similar saccharine liquids into alcohol and other products becomes converted into glycerin. In certain natural fatty substances, *e.g.*, palm oil, it exists in the free state, so that it can be separated by washing with boiling water, which dissolves the glycerin but not the fatty glycerides; but how far its occurrence in this form is due to the breaking up of the glyceride by a spontaneous saponification is open to some question.

In a state of purity glycerin is a viscid, colorless liquid possessing a somewhat mawkish sweet taste; when exposed to a high degree of cold for a long time it sometimes solidifies to a crystalline mass, which then melts at about 7° C. Under certain conditions, such as prolonged contact with poor cheese and chalk at about 35° to 40° C., it can be made to ferment partially, becoming changed into alcohol; but under any circumstances, only a small fraction, at most a tenth, becomes transformed, the rest remaining unaltered. It possesses remarkable solvent powers on many substances, whence it is employed for numerous purposes in pharmacy and the arts. Its viscid character, and its non-liability to dry and harden by exposure to air, also fit it for various other uses, such as lubrication, etc., while its peculiar physical characters, enabling it to blend with either aqueous or oily matters under certain circumstances, render it a useful ingredient in a large number of products of varied kinds. Applied to the living skin (and similarly to untanned leather) it produces a remarkable softening effect, whence it is largely employed as a cosmetic, either by itself or in admixture with other substances. Taken internally it is alleged to be valuable as a substitute for cod-liver oil for phthisical patients, not possessing the disagreeable fishy flavor of that valuable food, and having a fattening tendency. When it is given in moderately small repeated doses to the lower animals, it does not appear to possess any marked injurious action peculiar to itself; when, however, large doses of glycerine are subcutaneously injected into dogs, amounting to from eight to ten grammes per kilogramme of animal operated on (0.8 to 1.0 per cent. of the weight of the dog, corresponding to from one pound to one and one-half pounds of glycerine for the weight of an average man), death ensues within twenty-four hours, accompanied by symptoms analogous to those of acute alcoholism (Dujardin, Beaumetz, and Audigé). Like sugar, it possesses antiseptic qualities, so that meat, albumen, etc., immersed in it do not for long periods of time undergo putrefactive changes. The simplest modes of preparing glycerine in a state of purity are based on the saponification of fats, either by alkalis or analogous basic substances, or by super-heated steam.

GLYCINE, GLYCOCINE, GLYCOCOLI, or SUGAR OF GELATINE ( $C_2H_5NO_2$ ), occurs in colorless, transparent, rhombic prisms, which have a sweet taste, and are devoid of odor. It is very soluble in water, the solution having no effect on vegetable colors, but is insoluble in alcohol and in ether. Glycine combines both with acids (as hydrochloric, nitric, sulphuric, and oxalic acid) and with metallic oxides, and the compounds in both cases are soluble and crystallizable; they are, however, of no great importance.

GLYCOGEN ( $C_6H_{10}O_5 \cdot H_2O$  according to the analysis of Pelouze) is a substance which, in its properties, seems intermediate between starch and dextrine. In contact with saliva, pancreatic juice, diastase, or with the blood or parenchyma of the liver, it is converted into glucose, and hence its name of glycogen. It occurs only in the cells of the liver, where it exists as an amorphous matter, but in the early stage of foetal life, before the liver begins to discharge its functions, instead of being found in that organ, it exists in special cells of the foetal structures known as the placenta and the amnion, and in the muscles, horny tissues, etc. In severe forms of disease, and especially in febrile affections, it seems to be temporarily absent from the liver.

GLYCOL is the type of a new class of artificial compounds, whose existence was inferred, and afterward discovered, a few years ago, by Wurtz. In their chemical relation and properties, they form an intermediate series between the monobasic or monatomic alcohols, of which common alcohol is the type on the one hand, and the class of bodies of which ordinary glycerine is the type, on the other. The name of glycol, formed from the first syllable of glycerine and the last of alcohol, has been given to express this relation.

GLYCOSMIS, a genus of plants of the natural order *Aurantiaceæ*, trees, natives of the East Indies and the Mascarene Islands. The fruit of *G. citrifolia*, an East Indian species, is delicious.

GLYPTODON, a gigantic fossil animal belonging, like the megatherium and the mylodon, to the *Edentata*, but of the family of the *Dasytidae*, or armadillos. It is found in the post-tertiary deposits of the pampas of South America, and four species have been described. The back and sides of the creature were covered with a carapace of thick, polygonal bony plates, which in some cases was nearly six feet long.

GMELIN, JOHANN GEORG, a distinguished naturalist, son of the chemist of the same name, was born at Tübingen, June 12, 1709, and died in 1755.

GMELIN, LEOPOLD, a celebrated chemist, was born August 2, 1788, at Göttingen. He died at Heidelberg April 13, 1853.

GMELIN, SAMUEL GOTTLIEB, an eminent naturalist, nephew of J. G. Gmelin (see above), was born at Tübingen, June 23, 1743, and died in 1774.

GMÜND, a town of Würtemberg, circle of Jaxt, formerly a free imperial town, is situated in a charming and fruitful valley on the Rems, here spanned by a beautiful bridge, thirty-one miles east-northeast of Stuttgart. Population 12,838.

GNAT, a name (Anglo-Saxon, *gnæt*) properly applied to the members of the *Culicidæ* (a family of the insect order *Diptera*), but sometimes also used for the *Chironomidæ*. The *Culicidæ* consist of about one-hundred and fifty known species, of the genera *Culex*, *Anopheles*, *Aedes*, *Psorophora*, *Corethra*, etc.; they are distributed over the chief divisions of the world, and, in spite of their very feeble build, reach as far north as man has penetrated. As regards time, examples of a *Culex* and a *Corethra* have been discovered in the Tertiary beds of the Lower White River, Colorado. The *Culicidæ* are distinguished from their immediate allies, among other



characters, by having the parts of the mouth produced into a slender porrected rostrum, nearly half the length of the insect, and composed of many distinct pieces, and many jointed palpi, very long and pilose in the male, in which sex the antennæ are plumose and fourteen-jointed. The fibrils of the antennæ are considered by Mayer as auditory organs. The usual special representative of the family is *Culex pipiens*, the common gnat, whose blood-sucking propensities have rendered it too well known. It pierces the skin with the needle-like lancets of its rostrum, which are barbed at the tips, and gradually inserts the whole of those organs, at the same time liquefying the blood by some fluid secretion, which apparently adds to the subsequent irritation. The female, recognizable by her more simple antennæ and palpi, alone attacks man, and, in default of her favorite food, will feed on the honey of flowers. This blood-sucking taste is shared by the allied *Simuliidæ*. The dreaded mosquito is nothing but a species of *Culex*, so closely allied to *C. pipiens* that it is difficult to say where "gnat" ends and "mosquito" begins, though the original mosquito is a native of Cuba. The curious humming noise (from which the name *pipiens* is fancifully derived) accompanying the flight of the gnat is caused by the extremely rapid motion of its wings, which have been calculated to vibrate 3,000 times in a minute,—the great relative bulk of the thoracic muscles accounting materially for this.

GNESEN (Polish, *Gniezno*), the chief town of a circle in the Prussian province of Posen, government of Bromberg, is situated on the Wrzesnia, thirty miles east-northeast of Posen. Population (1890), 15,784.

GNEISS, a term introduced from the German as the name for a variety of metamorphic rock, which has the same component materials as granite, and differs from it only in these materials being arranged in layers rather than in an apparently confused aggregated mass. The minerals of which it is composed are quartz, feldspar, and mica. The mica is sometimes replaced by hornblende, producing a gneiss corresponding to the variety of granite called syenite.

GNOME, a pithy and sententious saying, commonly in verse, embodying some moral sentiment or precept. The gnome belongs to the same generic class with the proverb, but it differs from a proverb in wanting that common and popular acceptance which stamps the proverb, as it were, with public authority. In the Bible, the book of Proverbs, part of Ecclesiastes, and still more the apocryphal book of Ecclesiasticus, present, so far as regards language and structure, numberless illustrations of the highest form of this composition.

GNOME, the name given in the cabalistic and mediæval mythology to one of the classes of imaginary beings which are supposed to be the presiding spirits in the mysterious operations of nature in the mineral and vegetable world. They have their dwelling within the earth, where they preside especially over its treasures, and are of both sexes, male and female.

GNOMON. When a rectangle is divided into four parts by cross lines parallel to its sides, the sum of any three of the parts is called the gnomon. See Euclid, b. ii., prop. 5 and seq. Gnomon has also a meaning in dialing.

GNOSTICISM, a general name applied to various forms of speculation in the early history of the church. The term *γνῶσις* (*gnōsis*) is found in the Septuagint translation of the Old Testament, and in the Apocryphal Book of Wisdom, denoting the knowledge of the true God, or knowledge communicated by Him. In the New Testament the word is frequently used by St. Paul, and in the second epistle of St. Peter, to express the saving knowledge of God in Christ; and in the first

epistle to Timothy occurs the significant phrase, "Oppositions of science falsely so called." It may be inferred, therefore, that the use of the simple term, in a bad as well as a good sense, was not unknown to the apostolic age, although the expression Gnostic is said not to be found till the beginning of the second century, when it was first employed by the sect of the Ophites, or, according to some, by Carpocrates. Both expressions were used by the early Christian fathers with the double meaning already indicated. Clement of Alexandria, in his *Stromata* or *Miscellanies*, entitles the enlightened or perfect Christian a Gnostic. He points out at length the distinction between the true Gnostic and the disciples of false systems who laid claim to the name of Gnostics. It is only to systems of the latter kind that the name of Gnosticism is now applied.

The sources of Gnosticism are to be found in diverse forms of religious and speculative culture antecedent to Christianity, especially in the theology of the Alexandrian Jews, as represented in the writings of Philo, and again in the influences flowing from the old Persian or Zarathustrian religion and the Buddhistic faiths of the East. To the theosophic system of Philo, with its mixture of Platonic and Old Testament ideas, some of the most characteristic conceptions of Gnosticism are certainly to be traced, such as the infinite separation between God and the world, and the necessity of a mediating power or powers in the creation of the world. This class of ideas prevailed largely at the time of the introduction of Christianity, especially in Alexandria, which was the great meeting-point of Jewish and Hellenic culture. The more the state of the pre-Christian Jewish mind and Jewish literature is investigated, the more we recognize everywhere a strange commingling of old with new thoughts, of tradition with philosophy, of religion with speculation. The age was in all its aspects eclectic, and the Jewish no less than the Gentile schools of the time were centers for the fusion of old streams of culture from many quarters, and the rise of broader intellectual tendencies. Ever since the captivity, Judaism had borne more or less the impress of the old state religion which it encountered in its exile. How far post-Exilian Judaism was molded by Zarathustrian conceptions is a very difficult question; but no historical student can doubt that its cosmogony, its angelology, and even its anthropology, were largely modified by contact with Persia. But not only was Zarathustrianism active in and through Judaism. In itself, it spread westward, and became directly and indirectly both a precursor and a parent of Gnostic speculation. Certain forms of Gnosticism seem little else than adaptations of the Persian dualism to the solution of the great problem of good and evil. In other forms of it, again, the Pantheism of India seems to have been a pervading influence. This, too, has its representative in the Jewish schools of the time, in the secret doctrines of the Kabbala, which many carry considerably beyond the time of Christ, although the two books through which we alone know these doctrines—the *Book of Creation* and the book called *Rohar* or *Light*—are plainly of much later production. These doctrines sprung up in Palestine, and not among the Hellenistic Jews. The philosophy on which they rest is plainly pantheistic. Whereas the principle lying at the foundation of the theosophy of Philo makes almost an absolute distinction between the Supreme indefinable Source of all things and the world, the philosophic postulate of the Kabbala is the identity of God and the world—the one being the Eternal Substance of which the other is the manifestation and form.

Gnosticism is found reproducing one and all of these conceptions, with the additional idea of *redemption*



directly borrowed from Christianity. In all its forms it may be said to represent the efforts made by the speculative spirit of the time to appropriate Christianity, and to make use of some of its most fertile principles for the solution of the mysteries lying at the root of human speculation. The more advanced writers of the present day refuse to recognize Gnosticism as a *heresy*, or to speak of the Gnostics as deserters from the Christian Church. And they are right so far. The Gnostic schools were always so far outside the church. They were not *heretical*, therefore, in the ordinary sense. But it is no less true that Gnosticism, in all its developments, is only intelligible in its connection with Christianity. It was the impulse of Christian ideas which alone originated it, which constituted the vital force of thought that made it one of the most significant phenomena of early Christian history; and it is only its connection with Christianity which can be said to make it any longer interesting.

The question as to the date of its origin has been much investigated of late. Do we find traces of it in the New Testament writings? or are the supposed allusions to it there to be otherwise explained? It is well known that this question has an important bearing upon other questions as to the origin of some of the New Testament writings, and the special object for which these writings were composed. Without entering into details, or attempting to examine the several passages which may be supposed to contain allusions to Gnosticism in the New Testament, it may be said that such allusions, more or less definite, seem to occur in the later epistles of St. Paul, especially the epistles to the Ephesians and Colossians, and in the Pastoral epistles. The true explanation of all these phrases, as well as much else in St. Paul's writings, is probably the fact that the spirit of Gnosticism, and the language which it afterward developed and applied, were "in the air" of the apostolic age. Its modes of thought, as already seen, were prevalent in Philo and in other quarters, and the tendencies which were afterward worked up into systems, were no doubt in existence in the time of St. Paul, and still more in the later apostolic time. It seems plainly against such tendencies, rather than against any special sects or schools, that the cautions of St. Paul are directed. In the Apocalypse, and in the epistles and gospels attributed to St. John, these tendencies are seen in a more developed, although hardly in a more distinct, state.

The inchoate phase of Gnosticism is represented by men like Simon and Corinthus, both prominently associated with apostles and sects, such as the Ophites or Naasseni, the Peratae or Peratics, the Sethiani, and the followers of one Justinus, author of a book called the *Book of Baruch*, which was written probably not earlier than the beginning of the second century. All these sects are elaborately described by Hippolytus in the fifth book of his *Refutation of Heresies*. Simon Magus follows them in his order of treatment (l. v.) There can be little doubt, however, that Simon must be placed in the very front of the history of Gnosticism, in so far as he belongs to this history at all. This is the position that he occupies in the treatise of Irenæus; and his association with St. Peter, as well as the account of him in the apostolic history in which he appears within seven years of the ascension of our Lord, plainly indicates that this is his true position. The character of his teaching, moreover, points to the same conclusion. It is a form of anti-Christianism, rather than any mere depravation of the Christian system. It is true that he is represented in the passage of the Acts of the Apostles already referred to as having professed himself a believer, and having been baptized; but his whole career afterward, and

the doctrines attributed to him, prove that, whatever may have been his feelings for the moment, he neither understood Christianity, nor came under its practical influence in any degree. Probably he regarded the apostles as only magicians of remarkable skill, and enrolled himself for a time in their company in order that he might learn their secrets and be able to exercise their powers. He was plainly an impostor of the first magnitude, who must be credited with a marvelous and unblushing audacity rather than with any clear philosophic or spiritual aims. He recognized Christ as Redeemer, but only as occupying an inferior position to himself. He was the true Logos or Power of God, which had previously in an imperfect degree appeared in Jesus. He himself is "the God who is over all things, and the world was made by his angels." It is clear that a teacher of this kind had little relation to Christianity, except in so far as it came across his own designing and ambitious path. He had knowledge and intellectual address to avail himself of the prevailing conceptions of the Alexandrian philosophy, so as to impart some coherency to his own insane dreams; but he was characteristically a magician (as his character has survived in history) rather than a philosopher or spiritual thinker. He claims the position assigned to him in the history of Gnosticism mainly in virtue of his pupil and successor, Menander, who laid the foundation at Antioch of the Syrian Gnostic school more conspicuously represented by Saturninus and others.

The sects of the Naasseni, the Peratae, the Sethiani, and the followers of Justin, placed, as we have said, by Hippolytus before Simon, may probably all be ranked along with him and Cerinthus in the early and still undeveloped stage of Gnosticism. It is very difficult to attain to any certainty as to their chronological position. Bunsen traces the origin of the Ophites as far back as the Pauline age; but on very different grounds it may be concluded that the sect, if existent then, could hardly have acquired any prominence or intellectual interest,—not even in the time of St. John; and certain details of their teaching cannot well be earlier than the beginning of the second century.

Another name in the history of Gnosticism, that of Carpocrates, may be classed in this earlier period, although he is said to have been still active as a teacher in the time of Hadrian (117-138). The followers of Carpocrates are represented by Irenæus as first styling themselves Gnostics. His opinions had a certain affinity both with those of Cerinthus and the Ophites. They are described at length by Irenæus and Hippolytus. Both writers also ascribe to this teacher and his disciples a great devotion to magical arts, and accuse them of voluptuousness and even licentiousness of life. They seem to have cherished an esoteric doctrine which inculcated the indifference of all actions, and that nothing was really evil by nature. Some of the teachers of this sect marked their pupils by branding them on the inside of the lobe of the right ear. Epiphane, a son of Carpocrates, is associated with his father in the reign of Hadrian as actively promoting the spread of their heresy, and, dying young, he is said to have been worshiped as a god by the inhabitants of a town in Cephalonia, of which his mother was a native. He must have been a remarkable youth, credited as he is with a work on *Justice*, fragments of which have been preserved by Clement of Alexandria, advocating a very outrageous form of communism.

But, as already indicated, it is not till the first quarter of the second century that we see Gnosticism in full and systematic development; and then it ranges from two main centers—Antioch in Syria, and Alexandria.

Menander, the pupil of Simon, settled at Antioch,



and there laid the foundation of the Syrian Gnostic school, whose chief representatives in the second century are Saturninus, Tatian, and Bardesanes, the last two of whom were more or less connected with the church—Tatian, as a pupil of Justin Martyr, and the writer of a harmony of the four gospels under the name of *Diatessaron*, and Bardesanes as one of the first of the interesting series of hymn-writers for which we are indebted to the Syrian church. The Syrian Gnosis is distinguished by its admixture of Zarathustrian elements, and the consequent sharpness and precision with which it seizes the idea of conflict between the powers of Good and Evil—the Supreme God, on the one hand, and the Demiurge and his angels or æons, on the other hand. For a more particular account of the characteristics of the system, see articles on the names above mentioned.

Along with the Syrian school, and occupying a more prominent place in the development of the religious thought of the second century, stands the great school of Alexandrian Gnosticism, represented especially by Basilides and Valentinus and their followers. Basilides appears to have been a native of Syria, and to have taught in Alexandria about the year 125. "He is the first Gnostic teacher," says Bunsen, "who has left an individual personal stamp upon his age. \* \* \* His erudition is unquestionable. He had studied Plato deeply. \* \* \* All that was great in the Basilidean system was the originality of thought and moral earnestness of its founder." Bunsen also maintains that "Basilides was a pious Christian, and worshiped with his congregation," while admitting that his sect fell away from the church and from Christianity by refusing to recognize the authority of Scripture and the necessity of practical Christian communion.

Valentinus was probably educated in the school of Alexandrian Gnosticism, as he developed Gnostic ideas in their connection with Hellenic, rather than Persian, modes of thought into the most elaborate and carefully reasoned system which they reached. He came to Rome about the year 140, and there formed a sect which exercised considerable influence over the commingling speculations of the time which met in that great center.

In addition to these two great schools of Gnosticism there is still a third, especially represented by the famous Marcion of Pontus, whose center may be regarded as Asia Minor. Marcion was the son of a Christian bishop, by whom he is said to have been excommunicated. Following one Cerdon, a Gnostic of Antioch, Marcion distinguished himself by his extreme opposition to Judaism, and generally by a Gnostic attitude at variance with the Old Testament, the God of which is to him the Demiurge in conflict with the Supreme Being and the Christ whom He sent to redeem the world from the power of this Demiurge. His Christology was, of course docetic—the divine power being only united to the man Jesus for a time. He accepted only ten of St. Paul's epistles, and a mutilated copy of the gospel of St. Luke. The teaching of the Clementine fictions and a Jewish sect known by the name of Elkesaites, whose tenets seem to have resembled this teaching, is considered by Mansel and others to constitute a Judaizing reaction from the Pauline Gnosticism of Marcion.

Our readers are referred to special articles for a detailed exposition of these several Gnostic systems.

The fundamental questions with which Gnosticism concerned itself are the same which in all ages have agitated inquiry and baffled speculation, viz., the origin of life and the origin of evil—how life sprung from the Infinite Source—how a world so imperfect as this could proceed from a supremely perfect God. The Oriental notion of matter as utterly corrupt is found to pervade

all Gnostical systems, and to give so far a common character to their speculations. It may be said to be the ground-principle of Gnosticism.

Setting out from this principle, all the Gnostics agree in regarding this world as not proceeding immediately from the Supreme Being. A vast gulf, on the contrary, is supposed to separate them. In the general mode in which they conceive this gulf to be occupied they also agree, although with considerable varieties of detail.

The Supreme Being is regarded as wholly inconceivable and indescribable—as the unfathomable Abyss (Valentinus)—the Unnamable (Basilides). From this transcendent source existence springs by emanation in a series of spiritual powers. It is only through these several powers or energies that the infinite passes into life and activity, and becomes capable of representation.

GNU (*Catoblepas*), a genus of ruminant mammals constituting the equine group of the antelope family, and containing two species—the gnu or kokoon and the brindled gnu. Owing to their singular appearance, which has been aptly compared to that of a creature compounded of a bison's head, a horse's body, and an antelope's legs, their proper zoölogical position has been a matter of dispute—some placing them among the oxen, while others regard them as a connecting link between bovine animals and the true antelopes. The gnu measures about four feet and half in height at the shoulders, and nine feet in extreme length. Its nose is broad and flattened, and bears on its upper surface a crest of reversed hair, while there is an abundant growth of bushy black hair beneath the chin and between the forelegs. The horns, which are present in both sexes, are very broad at their base, forming a solid helmet on the forehead, from which they bend downward and outward, thereafter curving rapidly upward to the tip. A mane of light-colored hair, tipped with brown, and presenting a neatly clipped appearance, extends along the neck, while the horse-like tail, which is more or less of a creamy color, reaches to the ground. The nostrils are large, and are furnished with a muscular valve by which they can be closed. The gnu is a native of the arid plains of South Africa, where it congregates in considerable herds, its restlessness of disposition leading it to migrate frequently from place to place.

The brindled gnu is a more northerly form, never being found south of the Orange river. It is readily distinguished from the other species by the black color of its tail and mane, the obscure vertical streaks on its body, its more elevated withers, and its extremely long aquiline nose. While equally grotesque in appearance and manner, it is much less spirited and active than the gnu. Its flesh is highly prized by the natives, who also convert its hide into mantles, rendered attractive to South-African taste by being dressed without removing the long hair of the mane and beard.

GOA, a Portuguese settlement on the Malabar or western coast of India. It is bounded on the north by the river Tirakul or Auraudem, separating it from Sáwant Wári State, on the east by the Western Gháts, on the south by Kanara district, and on the west by the Arabian Sea. Total area, 1,062 square miles; population, 392,234.

Goa is a hilly country, especially the recently acquired portion known as the Novas Conquistas. Its distinguishing feature is the Sahyadri Mountains, which after skirting a considerable portion of the northeastern and southeastern boundary, branch off westward across the territory with numerous spurs and ridges. The plains are well watered by large navigable rivers. The most important is the Mandavi river, on whose banks both the ancient and modern cities of Goa stand, with a fine harbor formed by the promontories of Bardez and Salsette.



The port of New Goa or Panjim is divided into two anchorages by the projection of the *cabo* (cape) from the island of Goa; both capable of safely accommodating the largest shipping.

Goa ranks high as regards its early importance among the cities of western India. It emerges very distinctly in the fourteenth century, and was visited by the famous traveler Ibn Batuta. In the fifteenth century it formed the chief emporium of trade on the western side of India. Caravans of merchants brought down its products to the coast, and it was the only city in western India which enjoyed at this period a revenue of £10,000. Its wealth and advantageous situation attracted the Mahometan princes of the Deccan, and in 1469 it was taken by the Báhmani king. A fleet of 120 ships operated from the sea; the Báhmani troops forced their way down the passes of the Gháts; and Goa capitulated. It next passed under the Bijápur dynasty, and on the arrival of Albuquerque, at the beginning of the sixteenth century, its military and commercial capabilities at once struck his mind. In 1510 the fleet of Albuquerque, consisting of twenty sail of the line, with a few small vessels and 1,200 fighting men, hove in sight off the harbor. A holy mendicant or *jogi* had lately foretold its conquest by a foreign people from a distant land, and the disheartened citizens rendered up the town to the strangers. Eight leading men presented the keys of the gates to Albuquerque on their knees, together with a large banner which was usually unfurled on state occasions. Mounted on a richly caparisoned steed, Albuquerque entered the city in a triumphal procession, with the Portuguese banners carried by the flower of the Lisbon nobility and clergy amidst the acclamations of an immense multitude, who showered upon the conqueror filigree flowers of silver and gold. Albuquerque behaved well to the inhabitants, but was shortly afterward expelled by the Bijápur king. However, he returned a few months later with a fleet of twenty-eight ships, carrying 1,700 men, and after a bloody attack, in which 2,000 Mussulmans fell, forced his way into the town. For three days the miserable citizens were subjected to every atrocity. The fifth part of the plunder, reserved for the Portuguese crown, amounted to £20,000.

GOA POWDER, a drug occurring in the form of a yellowish-brown powder, varying considerably in tint, which has recently been brought to notice by Dr. Fayrer of Calcutta as a remedy for ringworm. It derives its name from the Portuguese colony of Goa, where it appears to have been introduced about the year 1852. In 1875 it was shown by Dr. Lima that the substance had been exported from Bahia to Portugal, whence it found its way to the Portuguese colonies in Africa and Asia. The tree which yields it belongs to the genus *Andria* of the natural order *Leguminosæ*, and has been named *A. Araroba*. It is met with in great abundance in certain forests in the province of Bahia, preferring as a rule low and humid spots. The tree is from 80 to 100 feet high, and is furnished with imparipinnate leaves, the leaflets of which are oblong, about one and one-half inches long and three-fourths of an inch broad, and somewhat truncate at the apex. The flowers are papilionaceous, of a purple color, and arranged in panicles. The Goa powder or araroba is contained in the trunk, filling crevices in the heartwood. To obtain it, the oldest trees are selected as containing a larger quantity, and after being cut down are sawn transversely into logs, which are then split longitudinally, and the araroba chipped or scraped off with the ax. During this process the workmen feel a bitter taste in the mouth; and great care has to be taken to prevent injury from the irritating action of the powder on the

eyes. In this state, *i.e.*, mixed with fragments of wood, the Goa powder is exported in casks.

GOÁLPÁRA, the most westerly district of Assam, bounded on the north by Bhutan, east by Kámrup, south by the Gáro Hills, and west by Kuch Behar and Rangpur. The district is situated on the Brahmaputra, at the corner where the river takes its southerly course into Bengal. The scenery is striking. Along the banks of the river grow clumps of cane and reed; farther back stretch fields of rice cultivation, broken only by the fruit trees surrounding the villages, and in the background rise the forest-clad hills overtopped by the white peaks of the Himalayas. The soil of the hills is of a red ochereous earth, with blocks of granite and sandstone interspersed; that of the plains is of alluvial formation. Earthquakes are common and occasionally severe shocks have been experienced. The Brahmaputra annually inundates vast tracts of country. Numerous extensive forests yield valuable timber. Wild animals of all kinds are found.

GOÁLPÁRA, the chief town of above district, situated on the left bank of the Brahmaputra. It was the frontier outpost of the Mahometan power in the direction of Assam, and has long been a flourishing seat of river trade.

GOAT. All the species of the genus *Capra* may be divided into two classes, the one being represented by the ibex (see IBEX) and the other the goat. The latter class is subdivided into the *ægragus* or wild goat and the domestic goat, of which there are many varieties.

The Wild Goat, or Paseng of the Persians (*Capra ægagrus*, Pall.), is an inhabitant of the mountainous regions of Central Asia from the Caucasus to the Himalayas, and is occasionally met with in troops at great elevations. It stands somewhat higher than any of the domesticated varieties of the goat, from which it further differs in its stouter limbs and more slender body. Its neck is short, and is thus fitted to bear the enormous horns, which in the male are larger proportionally than in any other ruminant animal. These measure nearly three feet in length, are obscurely triangular in form, transversely ridged, and are bent backward as in the domesticated varieties. The wild goat of the Himalayas, according to Darwin, when it happens to fall accidentally from a height, makes use of its massive horns by bending forward its head and alighting on them, thus breaking the shock. In the female the horns are exceedingly diminutive, or are altogether wanting. The fur, which over the greater part of the body is short, is of a grayish-brown color, with a black line running along the entire length of the back; the short tail and the muzzle are also black, while the under surface of the neck, and the beard, which are present in both sexes, are of a brown color. The paseng is exceedingly wary of the approach of man, and as its agility is no less remarkable, there has been little opportunity of studying it closely. The concretions known as *bezoar-stones*, which were formerly much used in medicine and as antidotes of poison, are believed to have been originally obtained from the intestines of this species.

Considerable diversity of opinion has been expressed by naturalists as to the original stock of the domestic goat, which is met with in nearly every quarter of the globe,—the now prevalent and the most probable opinion being that the various domestic breeds are severally descended from wild stock now extinct. Both the ibex and the *ægagrus* interbreed freely with the common goat, though the produce is not always fertile. Instances of this are not unusual in the Alps and Pyrenees, where goats abound in a semi-domesticated state. Hybrids between the goat and the sheep are also known to have occurred, but are rare.



The following are the chief domestic breeds, possessing distinct characteristics: The Common Goat, the Maltese, the Syrian, the Angora, the Cashmere, the Nubian or Egyptian, and the Dwarf Goat of Guinea.

*The Common Goat.*—This has many varieties which differ from each other in length of hair, in color, and slightly in the configuration of the horns. The ears are more or less upright, sometimes horizontal, but never actually pendent, as in some Asiatic breeds. The horns are rather flat at the base and not unfrequently corrugated; they rise vertically from the head, curving to the rear, and are more or less laterally inclined. The color varies from a dirty white to a dark brown, but never black, which indicates Eastern blood. Most of the European countries possess more than one description of the common goat.

*The Maltese Goat* has its ears long and wide and perfectly pendulous, hanging down below the jaw. The hair is long and cream-colored. Specimens of this kind are usually hornless, which is perhaps the cause of it having been called the "Hornless Variety."

*The Syrian Goat.*—This breed is met with in various parts of the East, in Lower Egypt, on the shores of the Indian Ocean, and in the island of Madagascar. Both its hair and ears are excessively long, the latter so much so that they are sometimes clipped to prevent their being torn by stones or thorny shrubs. Its horns are somewhat erect and spiral, with an outward bend.

*The Angora Goat* is often confounded with the Cashmere, but is in reality quite distinct from it. The principal feature of this breed, of which there are two or three varieties, is the length and quantity of its hair, which has a particularly soft and silky texture, covering the whole body and a great part of the legs with close matted ringlets. The horns of the male differ from those of the female, being directed vertically and in shape spiral, while in the female they have a horizontal tendency, somewhat like those of a ram. The face has a sheepish expression. The coat is composed of two kinds of hair, the one short and coarse and of the character of hair, which lies close to the skin, the other long and curly and of the nature of wool, forming the outer covering. Both are used by the manufacturer, but the exterior portion, which makes up by far the greater bulk, is much the more valuable. The process of shearing takes place in early spring, and is conducted with the utmost care; the average amount of wool yielded by each animal is about two and one-half pounds. The best quality comes from castrated males, the females producing the next best. The annual export of wool from Angora is estimated at about 2,000,000 pounds, and its value at £200,000. Large herds are shipped at Constantinople and sent to Cape Colony, where this breed thrives well and is largely propagated, the climate being specially suitable to the perfect development of the wool.

*The Cashmere Goat.*—This animal has a delicate head, with semi-pendulous ears, which are both long and wide. The hair varies in length, and is coarse and of different colors, according to the individual. The horns are very erect, and sometimes slightly spiral, inclining inward and to such an extent in some cases as to cross. The coat is composed, as in the Angora, of two materials; but in this breed it is the under coat that partakes of the nature of wool and is valued as an article of commerce. This undergrowth, which is of a uniform grayish-white tint, whatever the color of the hair may be, is beautifully soft and silky, and of a fluffy description resembling down. It makes its appearance in the autumn, and continues to grow until the following spring, when if not removed, it falls off naturally; its collection then commences, occupying from eight to ten

days. The animal undergoes during that time a process of combing by which all the wool and a portion of the hair, which of necessity comes with it, is removed. The latter is afterward carefully separated, when the fleece in a good specimen weighs about half a pound, being worth between half to three-quarters of a rupee. It is sold by the "turruk" of twelve pounds. This is the material of which the far-famed and costly shawls are made, which at one time had such a demand that, it is stated, "16,000 looms were kept in constant work at Cashmere in their manufacture." Those goats having a short, neat head, very long, thin ears, a delicate skin, small bones, and a long heavy coat, are for this purpose deemed the best. There are several varieties possessing this valuable quality, but those of Cashmere, Thibet and Mongolia are the most esteemed.

*The Nubian Goat*, which is met with in Nubia, Upper Egypt and Abyssinia, differs greatly in appearance from all those previously described. The coat is in the female extremely short, almost like that of a race-horse, and the legs are very long. This breed therefore stands considerably higher than the common goat. One of its peculiarities is the strongly convex shape of the face, the forehead being very prominent and the nostrils sunk in, the nose itself extremely small, and the lower lip projecting from the upper. The ears are long, broad and thin, and hang down by the side of the head like a "double lop" rabbit. The horns are quite black, slightly twisted, and very short, flat at the base, pointed at the tips and recumbent on the head. But little was known of this breed in Europe—in the West at least—until some ten or twelve years ago, when some were imported into France by the Société d'Acclimatation of Paris, who found its milking qualities to surpass those of all other breeds.

*The Nepaul Goat* appears to be a variety of the last breed, it having the same arched facial line, pendulous ears and long legs. The horns, however, are more spiral. The color of the hair, which is longer than in the Nubian, is black, gray, or white, with black blotches.

*The Guinea Goat* is a dwarf species originally from the coast whence its name is derived.

The milch goat has been aptly described as the "poor man's cow"—a designation it well merits, for with a couple of these animals the cottager may, at an almost nominal expense, enjoy the same advantages, in a domestic point of view, as the rich man with his "Alderney." Comparatively few are kept in England, because the advantages of goat-keeping are but very imperfectly known, and also on account of the large proportion of land under cultivation. The goat in a state of nature frequents hills and mountainous places, and, in a domesticated condition, it generally gives preference to elevated situations; but it is a mistake to suppose that it will not thrive on low ground. Being naturally adapted to rocks and dry soils, however, it should not be exposed in marshy places, as this brings on disease of the feet, and general ill-health; otherwise there is no animal more uniformly hardy. The common varieties will stand heat and cold equally well, but have a decided objection to storms of wind and rain; when they are left to roam loose, therefore, a rough shed should be erected to shelter them from the weather.

The goat breeds, generally speaking, but once a year. If well housed and under liberal treatment, it will bring forth young twice in twelve months; but this is not advisable. As a rule, at the first birth one kid only is produced, but afterward two, and sometimes three. One has been known for three consecutive years to drop four at a birth; but this is rare, and by no means desirable, as the progeny are sure to be small and thrive badly—



the dam, in most cases, having insufficient milk for so large a family.

GOATSUCKER, a bird from very ancient times absurdly believed to have the habit implied by the common name it bears in many European tongues besides our own. The common Goatsucker (*Caprimulgus europæus*, Linn.), is admittedly the type of a very peculiar and distinct Family *Caprimulgidae*, a group remarkable for the flat head, enormously wide mouth, large eyes, and soft, penciled plumage of its members, which vary in size from a Lark to a Crow. Its position has been variously assigned by systematists. Though of late years judiciously removed from the *Passeres*, in which Linnæus placed all the species known to him, Professor Huxley considers it to form, with two other Families—the Swifts and Humming-birds—the division *Cypselomorpha* of his larger group *Ægithognathæ*, which is equivalent in the main to the Linnæan *Passeres*.

The common Goatsucker of Europe (*C. europæus*) arrives late in spring from its winter retreat in Africa, and its presence is soon made known to us by its habit of chasing its prey, consisting chiefly of moths and cockchafers, in the evening twilight. As the season advances the song of the cock, from its singularity, attracts attention amid all rural sounds. This song seems to be always uttered when the bird is at rest, though the contrary has been asserted, and is the continuous repetition of a single burring note, as of a thin lath fixed at one end and in a state of vibration at the other, and loud enough to reach in still weather a distance of half-a-mile or more. On the wing, while toying with its mate, or performing its rapid evolutions round the trees where it finds its food, it has the habit of occasionally producing another and equally extraordinary sound, sudden and short, but somewhat resembling that made by swinging a thong in the air, though whether this noise proceeds from its mouth is not ascertained. In general its flight is silent, but at times, when disturbed from its repose, its wings may be heard to smite together. The Goatsucker, or, to use perhaps its commoner English name, Nightjar, passes the day in slumber, crouching on the ground or perching on a tree—in the latter case sitting not across the branch but lengthways, with its head lower than its body. In hot weather, however, its song may sometimes be heard by day and even at noontide, but it is then uttered, as it were, drowsily, and without the vigor that characterizes its crepuscular or nocturnal performance. Toward evening the bird becomes active, and it seems to pursue its prey throughout the night uninterruptedly, or only occasionally pausing for a few seconds to alight on a bare spot—a pathway or road—and then resuming its career. It is one of the few birds that absolutely make no nest, but lays its pair of beautifully-marbled eggs on the ground, generally where the herbage is short, and often actually on the soil. So light is it that the act of brooding, even where there is some vegetable growth, produces no visible depression of the grass, moss, or lichens on which the eggs rest, and the finest sand equally fails to exhibit a trace of the parental act. Yet scarcely any bird shows greater local attachment, and the precise site chosen one year is almost certain to be occupied the next. The young, covered when hatched with dark-spotted down, are not easily found, nor are they more easily discovered on becoming fledged, for their plumage almost entirely resembles that of the adults, being a mixture of reddish-brown, gray, and black, blended and mottled in a manner that passes description. They soon attain their full size and power of flight, and then take to the same manner of life as their parents. In autumn all leave their summer haunts for the south, but the exact time of their departure has hardly been ascertained. The habits of

the Nightjar, as thus described, seem to be more or less essentially those of the whole subfamily—the differences observable being apparently less than are found in other groups of birds of similar extent.

Very nearly allied to this genus is *Antrostomus*, an American group containing many species, of which the Chuck-will's widow (*A. carolinensis*) and the Whip-poor-will (*A. vociferus*) of the eastern United States (the latter also reaching Canada) are familiar examples. Both these birds take their common name from the cry they utter, and their habits seem to be almost identical with those of the Old World Goatsuckers.

GOBELIN, the name of a family of dyers, who in all probability came originally from Rheims, and who in the fifteenth century established themselves in the Faubourg Saint Marcel, Paris, on the banks of the Bièvre. The first head of the firm was named Jehan, and died in 1476. He discovered a peculiar kind of scarlet dye, and he expended so much money on his establishment that it was named by the common people *la folie Gobelin*. To the dye works there was added in the sixteenth century a manufactory of tapestry. So rapidly did the wealth of the family increase, that in the third or fourth generation some of them forsook their trade and purchased titles of nobility. More than one of their number held office of state, among others Balthasar, who became successively treasurer general of artillery, treasurer extraordinary of war, councilor secretary of the king, chancellor of the exchequer, councilor of state, and president of the chamber of accounts, and who in 1601 received from Henry II. the lands and lordship of Briecomte-Robert. He died in 1603. The name of the Gobelins as dyers cannot be found later than the end of the seventeenth century. In 1662 the works in the Faubourg Saint Marcel, with the adjoining grounds, were purchased by Colbert on behalf of Louis XIV., and transformed into a general upholstery manufactory, in which designs both in tapestry and in all kinds of furniture were executed under the superintendence of the royal painter Lebrun. On account of the pecuniary embarrassments of Louis XIV., the establishment was closed in 1694, but it was reopened in 1697 for the manufacture of tapestry, chiefly for royal use and for presentation. During the Revolution and the reign of Napoleon the manufacture was suspended, but it was revived by the Bourbons, and in 1826 the manufacture of carpets was added to that of tapestry. In 1871 the building was partly burned by the Communists.

GOBI is the name usually applied by European geographers to a vast stretch of desert in Central Asia. Like many other geographical designations, the word is not only of doubtful origin, but in conventional usage has modified its meaning. According to Sir T. Douglas Forsyth, it is originally the Turki for "great;" and Richthofen informs us that by the Chinese it is employed, not as a proper name, but, like Shamo, as a general term for any sandy and desert piece of country. This being the case, the great German geographer proposes to displace the word Gobi in European usage by the Chinese Han-hai or Dry Sea, suggestive as he says not only of the present appearance but also of the former history of the region; but it is to be feared that the older designation has become too familiar, and the disadvantages arising from its use are of too recondite a character to render it likely that his proposal will be generally accepted.

As a sea the Gobi or Han-hai must have been comparable in extent to the Mediterranean, and the ancient coast-line can be pretty clearly recognized. In its present state it may be divided into two distinct basins, the western taking its name from the river Tarim or Tarym,



and the eastern from the Chinese Shamo or "Sand Desert." The Dzungarian valley stretches westward like a gulf. The Tarim basin is bounded on the south by the range of mountains which, under various names applicable to different portions, such as the Kwen-lun and the Altyn-tag, forms the northward rim of the great plateau of Thibet; on the west it comes up to the spurs of the Pamir plateau, and on the north it lies along the foot of the Thian Shan. If we measure from the source of any of its principal tributaries, the Tarim must have a course of more than 1,000 miles. The head-waters rise in the mountains just named, and the more important of them in the south and west. The Khotan river and its confluent the Kara-Kash both descend from the Karakorum mountains, and flow in a generally northward direction; the Zarafshan or Yarkand River, rising in the same range, winds about in the first part of its course so as to enter the Gobi almost from the west; and the Kizil Su or Kashgar River has its numerous head streams in the Kizil Yart mountains belonging to the Pamir plateau. The Aksai River and the Shah Yar are the most important contributions from the Thian Shan. The course of all of these rivers after they enter the Gobi is largely matter of conjecture, and all that can be asserted with confidence is that they unite to form the Tarim, and find their final goal in an inland lake.

The Shamo or eastern basin is quite different in its character. Here we have no large river like the Tarim, and, instead of its boundaries being marked by lofty ranges of mountains from 13,000 to 20,000 feet high, the ground gradually rises in a series of scarcely marked terraces. The central point, at Ozon Khoshu, is the lowest discovered in Central Asia, being only 607 meters (1,948 feet) above the level of the sea.

Marco Polo was the first European who gave a distinct description of the desert of Gobi. He tells us how, on quitting Charchan (the modern Chachan, according to Yule), "you ride some five days through the sands, finding none but bad and bitter water; and then you come to a city called Lop, at the edge of the desert."

\* \* \* The length of the desert is so great that it would take a year and more to ride from one end of it to the other. It is all composed of hills and valleys of sand." And then he goes on to speak of spirits that haunt the waste, and syllable men's names, and of strange noises like the tramp and hum of a great cavalcade, of the sound of drums, and a variety of musical instruments. Polo appears to have proceeded east from Khotan to Lob, and then further east to Etsina, on the southern edge of the desert, and afterward to have spent forty days in crossing the desert northward to Karakorum.

**GOBY.** The Gobies (*Gobius*) are small fishes readily recognized by their ventrals (the fins on the lower surface of the chest) being united into one fin, forming a suction disk, by which these fishes are enabled to attach themselves in every possible position to a rock or other firm substances. They are essentially coast fishes, inhabiting nearly all seas, but disappearing toward the Arctic and Antarctic Oceans. Many enter, or live exclusively in, such fresh waters as are at no great distance from the sea. Between 200 and 300 different kinds are known.

**GOD.** See **THEISM**.

**GODALMING**, a municipal borough and market town of England, county of Surrey, is situated thirty-two miles southwest of London, in a valley on the right bank of the Wey, which is navigable thence to the Thames. Population (1890), 2,600.

**GODAVARI**, a river of Central India, which flows across the Deccan from the Western to the Eastern Gháts, for sanctity, picturesque scenery, and utility sur-

passed only by the Ganges and the Indus. The total length is 898 miles; the estimated area of drainage basin 112,200 square miles. Its traditional source is on the side of a hill behind the village of Trimbak in Nasik district, Bombay, but according to popular legend it proceeds from the same ultimate source as the Ganges, though underground. Its course is generally south-easterly.

The upper waters of the Godávári are scarcely utilized for irrigation, but the entire delta has been turned into a garden of perennial crops by means of the anicut at Dhaulaishvaram, from which three main canals are drawn off. The river channel here is three and a half miles wide. The anicut is a substantial mass of stone, bedded in lime cement, about two and a half miles long, 130 feet broad at the base, and twelve feet high.

**GODÁVARI**, a district of Madras presidency, British India, bounded north by the Central Provinces and Vizagapatam district, east by Vizagapatam and the Bay of Bengal, south by the Bay of Bengal and Kistna district, and west by the Nizám's dominions. The district is divided by the Godávári river into two nearly equal parts. Area 7,345 miles; population, 1,800,000.

**GODEFROI.** See **GOTHOFRED**.

**GODFREY OF BOUILLON.** See **BOUILLON**, on page 1066.

**GODERICH**, a city and port of entry of Ontario, Can., is situated on Lake Huron, 160 miles from Buffalo. It has a good harbor and a thriving trade. The manufactures include woollens, machinery, leather, castings, boots and shoes, and much salt is shipped. Population (1890), 6,000.

**GODOLPHIN**, **SIDNEY GODOLPHIN**, **EARL OF**, was a cadet of an ancient family of Cornwall, and was born most probably in 1635. He held office under the various sovereigns of England from Charles II. to Queen Anne, serving under William, prince of Orange, although more than suspected of treasonable correspondence with James II. after his expulsion from the throne. On the accession of Queen Anne he was made lord treasurer (the office he had held before under William of Orange), which position he held till 1710. He died September 15, 1712.

**GODOY.** See **ALCUDIA**.

**GODWIN**, **FRANCIS**, a distinguished English author, son of Doctor Godwin, bishop of Bath and Wells, was born at Havington in Northamptonshire in 1561. In 1601 he published his *Catalogue of the Bishops of England since the first planting of the Christian Religion in this Island*, a work which procured him in the same year the bishopric of Llandaff from Elizabeth. He is also the author of a somewhat remarkable story, published posthumously in 1638, and entitled *The Man in the Moon, or a Discourse of a Voyage thither, by Domingo Gonsales*, written apparently sometime between the years 1599 and 1603. He was the author of several other works of minor importance. He died in 1633.

**GODWIN**, **MARY WOLLSTONECRAFT**, an English authoress of the last century, was born at Hoxton, on April 27, 1759. Her principal productions are: *Mary, a Fiction*; *Original Stories from Real Life*; *A Vindication of the Rights of Woman* and *Letters from Norway*. She also translated *The Elements of Morality* and Lavater's *Physiognomy*. She was for some time the mistress of an American, Captain Imlay, by whom she had a daughter. On her separation from Imlay she attempted suicide by drowning, but was rescued. She afterward married William Godwin, by whom she had one daughter, Mary, who became the wife of the poet Shelley. She died September 10, 1797.

**GODWIN**, **WILLIAM**, an English political writer,



historian, novelist and dramatist, was born March 3, 1756, at Wisbeach, in Cambridgeshire, and died in 1836. He was the husband of the subject of the preceding article. His first published work was an anonymous *Life of Lord Chatham*. In 1793 Godwin published his great work on political science, *The Inquiry concerning Political Justice, and its Influence on General Virtue and Happiness*. Although this work is little known and less read now, it was one of the epoch-making books of English thought. In May, 1794, Godwin published the novel of *Caleb Williams, or Things as they are*, a book of which the political object is overlooked by many readers in the strong interest of the story. It is one of the few novels of that time which may be said still to live.

GODWINE, son of Wulfnoth, earl of the West-Saxons, is the leading Englishman in the first half of the eleventh century, and he holds a special place in English history generally. He is the first Englishman who plays the part of a minister and parliamentary leader, of one high in office under the crown who at the same time sways the assemblies of the nation by his power of speech.

His birth and origin are utterly uncertain. There are two alternative statements, which are seemingly quite irreconcilable, but either of which alone would have much to be said for it. By putting together certain passages in the English Chronicles, in Domesday, and in the will of the Ætheling Æthelstan, son of King Æthelred, a strong presumption is raised that Godwine was the son of Wulfnoth the South-Saxon who was outlawed in 1009, and that his services in the war against Cnut were deemed to entitle him to a restitution of his father's forfeited lands. There is no direct statement to this effect, but a number of undesigned coincidences point toward such a belief. On the other hand, there is a story which appears in various quarters, and which seems to come from more than one independent source, which makes Godwine's father Wulfnoth a churl somewhere on the borders of Gloucestershire and Wiltshire, and which makes Godwine win the favor of the Danish earl Ulf by showing him his way after the battle of Sherstone in 1016. A third account connects Godwine with the family of Eadric the traitor of Æthelred's day; but this version seems at once to be impossible to reconcile with either of the other two stories, and to rest on less authority than either.

But, whatever was Godwine's origin, there is no doubt that, according to Cnut's rule of preferring Englishmen to high office, he rose to power very early in that king's reign. He was an earl in 1018. The next year he distinguished himself at the head of the English troops in Cnut's Northern wars, and received in marriage Gytha, the sister of the king's brother-in-law Earl Ulf. In 1020 he became earl of the West-Saxons, that is, of all England south of the Thames, a new office, doubtless connected with Cnut's frequent absences from England. All this again is not in the Chronicles, though particular points are incidentally confirmed by them. Still this stage of his history seems to be fairly made out from other sources.

From Cnut's death in 1035 the events of Godwine's life are recorded in the Chronicles, often with great minuteness. Much is also learned from the contemporary biographer of Eadward. He asserted the claims of Harthacnut, the son of Cnut and Emma, to the crown of his father; but he had to consent to a division of the kingdom, and could only secure Wessex for Harthacnut, while Harold reigned in Northumberland and Mercia. He then acted as the chief minister of Emma, while she was regent on behalf of Harthacnut during his first reign. During this time the Ætheling

Ælfred, son of Æthelred and Emma, landed in England in the hope of winning back his father's crown; but coming into the power of Harold, he was blinded by his order, and died of his wounds. Godwine was said to have betrayed Ælfred to Harold, and the charge was eagerly seized upon by the Norman writers. But it was not invented by them. At the beginning of Harthacnut's second reign in 1040, Godwine was formally accused of the death of Ælfred, and was regularly tried and acquitted. Godwine remained in power during the reigns of Harold and Harthacnut, and on the death of the last-named king in 1042, he was foremost in promoting the election of Eadward, the son of Æthelred and Emma, to the vacant throne. As earl of the West-Saxons he was the first man in the kingdom, but his power was still balanced by that of the other great earls, Leofric in Mercia and Siward in Northumberland. His sons Swegen and Harold, together with Beorn, the nephew of his wife Gytha, were promoted to earldoms, (1043-1045), and his daughter Eadgyth was married to the king (1045). We hear much of his good and strict government of his earldom, and of his influence with the king and with the whole nation. He was not, however, all-powerful; in one very remarkable case, which is most instructive as a piece of constitutional history, he was out-voted in the witenagemót on a question of foreign policy. In 1047, when his wife's nephew Swegen Estrithson, now king of the Danes, was at war with Magnus of Norway, Godwine proposed to help Swegen with fifty ships; but the notion was opposed by Leofric, and "all folk" accepted the amendment of the Mercian earl. Godwine had also to strive against the king's fondness for Normans and other strangers, above all in the disposal of ecclesiastical offices. Godwine's policy in this and in other matters, was opposed to all French connections of every kind. Next to Englishmen he favored natives of the kindred Continental lands, and he supported a policy of alliance with the empire and its princes. In all this, at home and abroad, he had specially to withstand the influence of the king's Norman favorite, Robert of Jumièges, appointed bishop of London in 1044 and archbishop of Canterbury in 1051. Godwine was supported by the English bishops Stigand of Winchester and Lyfing of Worcester. The appointment of Robert to the archbishopric marks the decline of Godwine's power; the foreign influence was now at its height, and the English earl was to feel the strength of it.

In the course of 1051 a series of outrages committed by the king's foreign favorites led to a breach between the king and the earl. The king's brother-in-law, Eustace count of Boulogne, returning with his followers from a visit to the king, tried to obtain quarters by force in the houses of the burgesses of Dover. An Englishman who withstood them was killed, a fight followed, in which the count and his company were driven out of the town. The king, hearing the tale from Eustace, bade Godwine inflict military chastisement on the townsmen; the earl refused, and demanded a fair trial of the charge before the witan. About the same time men's minds were stirred by the outrages of several Normans who had received estates in Herefordshire. The influence of the archbishop was used against Godwine, and he was summoned to appear before the witan at Gloucester as a criminal. He and his sons now gathered the whole force of their earldoms, and marched toward Gloucester in arms. They demanded the surrender of Count Eustace and of the other strangers who had done outrages, whether at Dover or in Herefordshire. The king called the other earls to his help; war was hindered by the mediation of Leofric, and matters were adjourned to another meet-



ing in London. There the king appeared with an army; Godwine and his sons were arraigned as criminals, and, on refusing to appear without a safe conduct, were out-lawed. Godwine and his whole family now left the kingdom, except his daughter, the Lady Eadgyth, who was banished from court to the monastery of Wherwell. The foreign favorites of the king were now supreme.

The next year the tide turned; the feeling of the nation showed itself in favor of Godwine. When his petition for a removal of his outlawry was refused, he came back from his shelter in Flanders at the head of a fleet. In most parts of England he was welcomed; he sailed up the Thames to London; the army gathered by the king refused to fight against him; and, in a great meeting outside the walls of London, he and his family were restored to all their offices and possessions, and the archbishop and many other Normans were banished. Godwine's friend Stigand succeeded to the archbishopric. The next year Godwine was smitten with a fit at the king's table, and died three days later, April 15, 1052. His death was worked up into a fabulous tale by his Norman enemies.

GODWIT, a word of unknown origin, the name commonly applied to a marsh-bird in great repute, when fattened, for the table, and formerly abundant in the fens of Norfolk, the Isle of Ely, and Lincolnshire.

The Godwits belong to the group *Limicola*, and are about as big as a tame Pigeon, but possess long legs, and a long bill with a slight upward turn. It is believed that in the genus *Limosa* the female is larger than the male. While the winter plumage is of a sober grayish-brown, the breeding-dress is marked by a predominance of bright bay or chestnut, rendering the wearer a very beautiful object. The Blacktailed Godwit, though varying a good deal in size, is constantly larger than the Bar-tailed, and especially longer in the legs. The species may be further distinguished by the former having the proximal third of the tail-quills pure white, and the distal two-thirds black, with a narrow white margin, while the latter has the same feathers barred with black and white alternately for nearly their whole length.

America possesses two species of the genus, the very large Marbled Godwit or Marlin, *L. fedoa*, easily recognized by its size and the buff color of its axillaries, and the smaller Hudsonian Godwit, *L. hudsonica*, which has its axillaries of a deep black. This last, though less numerous than its congener, seems to range over the whole of the continent, breeding in the extreme north, while it has been obtained also in the Strait of Magellan and the Falkland Islands. The first seems not to go further southward than the Antilles and the Isthmus of Panama.

GOES, or TER GOES, a town of the Netherlands in the province of Zealand, on the island of South Beveland, with railway communication since 1868 with Bergen-op-Zoom, and since 1872 with Middelburg, its distances from these places being respectively twelve and fifteen miles.

GOES, HUGO VAN DER, a painter of considerable celebrity at Ghent, was known to Vasari, as he is known to us, by a single picture in a Florentine monastery. The date of his birth is unknown; he died in 1482.

GOETHE, JOHANN WOLFGANG VON, was born in Frankfort on August 28, 1749. His parents were citizens of that imperial town, and Wolfgang was their only son and their eldest child. His father was born on July 31, 1710, and in 1742 received the title of imperial councilor. He married on August 20, 1748, at the age of thirty-eight, Catherine Elizabeth Textor, a girl of seventeen. Her family was better than his own, and held a higher position in the town. Her father was

imperial councilor, and had been schultheiss or chief magistrate. In December, 1750, was born a daughter, Cornelia, who remained until her death, at the age of twenty-seven, her brother's most intimate friend. She was married in 1773 to John George Schlosser. The house in which Goethe was born is still to be seen in the Hirschgraben. His education was irregular; he went to no school, and his father rather stimulated than instructed him. But the atmosphere by which he was surrounded gave him, perhaps, the best education he could have received. Goethe must have been brought up with the ambition to take his degree at the university as a doctor, to return home and become an advocate, to make a rich marriage, to go through the regular course of civil offices, to inherit his father's house, and perhaps one day to be burgomaster. His home was a cultivated one. The father was fond of art and of the German poetry then in fashion. French culture gave at this time the prevailing tone to Europe. Goethe could not have escaped its influence, and he was destined to fall under it in a special manner. In the Seven Years' War, which was now raging, France took the side of the empire against Frederick the Great. Frankfort was full of French soldiers, and a certain Comte Thorane, who was quartered in Goethe's house, had an important influence on the boy. Still more strongly was he affected by the French company of actors, whom he came to know both on and off the stage. He learned to declaim in this manner passages of Racine without understanding a word of them. At a later period he knew French thoroughly well, and composed both prose and poetry in that language. His first writings were imitations of the French manner; his earliest play was the imitation of a French after-piece.

In the autumn of 1765 Goethe, who had just completed his sixteenth year, traveled to Leipsic and was admitted as a student of the Bavarian nation, one of the four into which the university was divided. For his lodging he had two neat little rooms in the Feuerkugel, the Fire Ball, looking into the long court-yard which leads from the old market to the new. He was sent to Leipsic to study law, in order that he might return to Frankfort fitted for the regular course of municipal distinction. For this purpose he carried with him a letter to Professor Böhme, who taught history and imperial law in the university, but had no other distinction to recommend him. He told Professor Böhme that he intended to devote himself not to law but to belles lettres, or, to use the word which F. A. Wolf had invented, philology. Böhme did his best to dissuade him, and in this was assisted by his wife. The effect of their advice was rather to disgust Goethe with modern German literature, to make him despise what he had already written, and to drive him into the distractions of society, which wasted both his time and his money. He did, however, attend some lectures. His position toward the professors of his university was not an enviable one. His real university education was derived from intercourse with his friends. First among these was J. G. Schlosser, who afterward married his sister. Goethe used to dine with him at a table d'hôte kept by a wine-dealer, Shönkopf, in the Bruhl, in a house which still exists. Schlosser, who was at this time private secretary to the duke of Würtemberg and tutor to his children, was ten years older than Goethe. He had a great influence upon him, chiefly in introducing him to a wider circle of German, French, English, and Italian poetry. At the table of Professor Ludwig, where Goethe had previously dined the conversation had generally turned on medical and scientific subjects. Another friend of Goethe's was Behrisch, tutor to the young Count Lindenau. He probably had a consid-



erable effect in producing the simplicity and naturalness of Goethe's early style.

But the person who had the strongest effect on Goethe's mental development was Adam Frederick Oeser, at this time director of the academy of arts in Leipsic. Goethe always spoke of Oeser's influence with the greatest affection and respect.

The end of Goethe's stay at Leipsic was saddened by illness. One morning at the beginning of the summer he was awakened by a violent hemorrhage. For several days he hung between life and death, and after that his recovery was slow, although he was tended with the greatest anxiety by his friends. He finally left Leipsic far from well on August 28, 1768, his nineteenth birthday.

Goethe made an enforced stay of a year and a half in his native town. It was perhaps the least happy part of his life. He was in bad health. During his stay at Frankfort he wrote very little. It may be that the two Leipsic dramas received here their completed form. A farce in memory of his Leipsic life, a poetical letter to Frederike Oeser, the daughter of his teacher, a few songs, some of them religious, make up the tale of his productions, as far as we know them.

He arrived at Strasburg April 2, 1770. It was intended that after a sojourn in the university of that place he should visit Paris, the center of refinement. Goethe stayed in Strasburg till August 28, 1771, his twenty-second birthday, and these sixteen months are perhaps the most important of his life. During them he came into active contact with most of those impulses of which his life was a development. If we would understand his mental growth, we must ask who were his friends. He took his meals at the house of the Fräulein Lauth in the Krämergasse. The table was mainly filled with medical students. At the head of it sat Salzmann, a grave man of fifty years of age. His experience and his refined taste were very attractive to Goethe, who made him his intimate friend. Goethe was soon drawn by the studies of his companions to desert his own. A note-book of this date is preserved, which gives us a full account of his studies and employments. He attended lectures on anatomy, on midwifery and on chemistry. His own studies were chiefly devoted to the last science; and he did not forget his favorite alchemy. He had brought with him to Strasburg introductions to pietistic circles, and this made him at first somewhat staid and retired in his pleasures, and disinclined for general society. This soon wore off, and the natural cheerfulness of his genial nature returned to him. Two songs, *Blinde Kuh* and *Stirbt der Fuchs so gilt der Balg*, refer to the social life of this period. He went on picnics, he wrote French poetry, he took dancing lessons, he learned the violoncello. The table of the Fräulein Lauth received some new guests. Among these was Jung-Stilling, the self-educated charcoal-burner, who in his memoir has left a graphic account of Goethe's striking appearance, his broad brow, his flashing eye, his mastery of the company, and his generosity of character. Another was Lersé, a frank open character who became Goethe's favorite, and whose name is immortalized in *Götz von Berlichingen*. His diary also shows that he spent much time in philosophical speculation. But the most important event of his Strasburg sojourn was his acquaintance with Herder. He was five years older than Goethe. Herder was then traveling as tutor to the young prince of Holstein-Eutin, but was obliged to spend the whole winter of 1770-71 in Strasburg on account of an affection of his eyes. Goethe was with him every day, often all day. Herder, who was a pupil of a more original genius, Hamann, taught him the true value of nature in art, and the prin-

ciples of what we should now call the romantic school. He made *Ossian* known to him, and the wealth of popular poetry in all nations which the publication of *Ossian* revealed; he enchanted him with the idyllic simplicity of the *Vicar of Wakefield*; but, above all, he shook his sensibility to the roots by revealing to him the power of the mighty Shakespeare. He now saw how far superior Homer was to his Latin imitators, and how false were the canons of French art. Goethe's spirit was liberated from its trammels, and *Götz* and *Faust* and *Wilhelm Meister* became possible to his mind. At a later period he forged for himself fetters of a different kind.

Goethe's stay at Strasburg is generally connected still more closely with another circumstance — his passion for Frederike Brion of Sesenheim. At least ten songs are addressed to her, and several others were written for her.

Goethe's return to Frankfort is marked by a number of songs, of which the *Wanderer's Sturmlied* is the most remarkable. He found his Frankfort existence more intolerable than before. These months were full of literary activity. To them belong an oration on Shakespeare, delivered at Frankfort, an essay on Erwin von Steinbach, the builder of the Strasburg cathedral, two theological treatises of a neologistic character on the commandments of Moses and the miraculous tongues of Pentecost, and a number of reviews written for the *Frankfurter Gelehrte Anzeiger*, which had been founded by Merck. But the work into which he threw all his genius was the dramatization of the history of the imperial knight of the Middle Ages, Gottfried or Götz von Berlichingen. The immediate cause of this enterprise was his enthusiasm for Shakespeare. After reading him he felt, he said, like a blind man who suddenly receives his sight. The unities of time and place vanished into nothing. The true form of art was seen to be that which holds the wayward impulses together by an invisible bond, just as in the life of man necessity is wedded to free will. The study of a dry and dull biography of Götz, published in 1731, supplied the subject for his awakened powers. From this miserable sketch he conceived within his mind a complete picture of Germany in the sixteenth century. The chief characters of his play are creatures of his imagination representing the principal types which made up the history of the time. Every personage is made to live; they speak in short sharp sentences like the powerful lines of a great master's drawing. The first sketch of *Götz* was finished in six weeks, in the autumn of 1771. Cornelia was consulted at every stage in the work. Herder saw it, and gave his approval. On his return from Wetzlar in 1773 Goethe wrote the piece over again, and published it, with the help of Merck, in the form in which we now possess it. It ran like wild-fire through the whole of Germany. It was the progenitor, not only of the *Sturm und Drang* period to which it gave the tone, but of the romantic knightly literature which teemed from the German press. At a later period, in 1804, Goethe prepared another edition for the stage, which took five hours in acting. It has never been represented since.

With the manuscript of *Götz* in his pocket, Goethe left Frankfort in the spring of 1772 for Wetzlar, a quiet country town on the Lahn, one of the seats of Government of the Holy Roman Empire. The emperors lived at Vienna; they were crowned at Frankfort; they held their parliaments at Ratisbon, and at Wetzlar their courts of justice. It was the custom for young lawyers to attend the sittings of these courts for a certain time before they could be admitted to practice on their own account. The company of these students of



the embassies from the component parts of the empire, and of various imperial officials, made the society a pleasant and lively one. Goethe soon found friends. The secretary of the Brunswick legation, Goué, formed a round table of knights,—a Ritter-tafel. The members adopted names from the age of chivalry, and apportioned among themselves the neighboring villages as commanderies and fiefs. Goethe took the name of Götz. Deeds of prowess were performed in friendly rivalry, chiefly of eating and drinking. This masquerade at least served to keep the idea of Götz constantly before his mind. But the place has sadder associations. It is impossible to dissociate the name of Wetzlar from that of Werther. The Deutsches Haus, then the property of the knights of the Teutonic order, exists still in the main street of Wetzlar. It was occupied by one of the officials of the order, by name Buff, an honest man with a large family of children. The second daughter, Lotte, blue-eyed, fair, and just twenty years of age, was first met by Goethe shortly after his arrival at a ball at at Wolpertshausen. She strongly attracted him; he became a constant visitor at the house. He found that Lotte was a second mother to her brothers and sisters, and he delighted to play games with them and tell them stories. Lotte was really though not formally engaged to Kestner, a man of two-and-thirty, secretary to the Hanoverian legation. The discovery of this relation made no difference to Goethe; he remained the devoted friend to both. He visited Lotte and her children; he walked with Kestner about the streets till midnight; they kept their common birthday together in the German house, on August 28th; Kestner felt no jealousy; Goethe was content with Lotte's friendship; her heart was large enough for both. But the position was too critical to last. On September 10th they met in the German house for the last time. Lotte spoke of the other world, and of the possibility of returning from it. It was arranged between them that whoever died first should appear to the others. This conversation confirmed Goethe's purpose; he determined to go away. He made no adieu, but wrote a line to Kestner to say that he could not have borne to stay a moment longer. Merck had probably persuaded him to this step. To divert his mind he took him to Ehrenbreitstein and introduced him to Sophie la Roche, the friend of Wieland's youth, and to her daughter Maximiliane, with whom Goethe was charmed. The places in the neighborhood of Coblenz were visited. Goethe returned to Frankfort by the river in a yacht. Here he was possessed with the memory of Lotte. He fastened her silhouette over his bed. Kestner came to Frankfort in September. Goethe and Schlosser went together to Wetzlar in November. Here he heard of the death of Jerusalem, a young man attached to the Brunswick legation. He had been with Goethe at the university of Leipsic, but he had seen little of him at Wetzlar. Of a moody temperament, disheartened by failure in his profession, and soured by a hopeless passion for the wife of another, he had borrowed a pair of pistols from Kestner under pretense of a journey, and had shot himself on the night of October 29th.

Goethe obtained a full narrative of the circumstances from Kestner, and immediately afterward began his *Werther*, in which the circumstances above related are all interwoven. Goethe tells us that it was written in four weeks, but this can hardly have been the case. We have notices of its slow progress during the whole of the summer of 1773. In 1774 it is far advanced enough to be shown to some intimate friends. It is not till the middle of September, 1774, that two copies of the book are sent in the greatest secrecy to Sophie la Roche and Lotte Buff. In October it spread over the whole of

Germany. It was enthusiastically beloved or sternly condemned. It was printed, imitated, translated into every language of Europe, criticised in every periodical, with the fullest meed of praise or scorn. It made the round of the world, and penetrated even to China. The *Werther* fever wrung the hearts of men and women with imaginary sorrows; floods of tears were shed; young men dressed in blue coats and yellow breeches shot themselves with *Werther* in their hands. It opened the floodgates of pent-up sentimentalism which had been stirred by the philosophy of the time, and which the calamities of the next generation were sternly to suppress. It may be imagined that Kestner and Lotte were not well satisfied with the liberty which Goethe had taken with them. They were married on April 4, 1773, and Goethe provided the wedding ring. Notwithstanding the coolness which the publication of *Werther* produced between them, the correspondence between Goethe and Kestner continued to the end of the century. Lotte saw Goethe in Weimar in 1816, when she was sixty-three years old; she was still beautiful, but her head shook with palsy. She died in 1828. The second part of *Werther* represents the agony of a jealous husband. This was inspired by Bretano, an Italian merchant resident in Leipsic, a widower with five children, who had married Maximiliane, the daughter of Sophie la Roche. Goethe loved her as an elder brother, but her husband scarcely approved of the intimacy. *Götz* and *Werther* formed the solid foundation of Goethe's fame. They were read from one end of Germany to the other.

These two great works were not the only occupations of Goethe at this time. In Wetzlar he had translated Goldsmith's *Deserted Village*, and had written a number of small poems addressed to Lotte. The spring of 1773, which witnessed the publication of *Götz*, saw him actively employed as an advocate. His relations with his father became easier. His literary success brought him a number of friends,—the young Counts Stollberg, and Von Schönborn, a friend of Klopstock's. He also began to correspond with Lavater the physiognomist and with Klopstock himself. To the latter half of this year are to be referred a number of satirical poems, aimed at prevailing follies of the time, clever and amusing, but of little permanent value. In *Peter Brey* he satirized the meddler Leuchsenring, who, with soft tread and lamb-like manners, interfered with the family relations of Herder. *Satyros* is directed against the prophets of the school of nature, who bid us return to nature without remembering how coarse and repellant some aspects of nature are. Bahrtdt had translated the Bible into modern cultivated German; Goethe wrote a prologue to this newest of divine revelations, in which the four evangelists appear each with his attendant animal. The most important of these writings is *Gods, Heroes, and Wieland*, a dialogue in the style of Lucian written at a sitting over a bottle of Burgundy, in which Alcestis, Mercury, Hercules, Euripides, and other ancient worthies appear to Wieland in all their original greatness, and upbraid him with the mean and paltry representation of them which he had given to the world. Wieland was the apostle of an emasculated antiquity. Goethe would make the gods speak in their own large utterance if they spoke at all. Wieland revenged himself by recommending the satire in his paper, the *Deutsche Merkur*, as a delicate piece of persiflage worthy of the study of his readers. In November Goethe's sister Cornelia was married to Schlosser and left Strasburg. Goethe felt the loss deeply. She lived but a short time. Her married life was tortured with perpetual suffering, and she died in 1777.

The beginning of 1774 is marked by a new passion and a new work. Crespel had invented a plan for en-



livening their social meetings; each man was to draw lots for a partner, and for the time to consider her as his wife. Three times Goethe drew the name of Anna Sibylla Münch, a pleasant girl of sixteen, daughter of a merchant. One of the favorite topics of the day was the trial of Beaumarchais, which ended on February 16, 1774. Immediately afterward his *Mémoires* or pleadings were published, and from the fourth of these the play of *Clavigo* was arranged. It represents a young writer of ambition deserting the woman to whom he is engaged and breaking her heart. The fifth act, in which Clavigo kills himself, is Goethe's own. The real Clavigo died, a distinguished man of letters, in 1806. The piece was written in eight days, and published on June 1st. It had a great success, and still keeps the stage. But Goethe's best friends were disappointed with it. Merck told him not to write such trash, as others could do that as well. In reality there is no period of Goethe's life in which his literary activity was so prodigious, or when he was more fully occupied with literary plans which had reference to the deepest problems of human nature. To this time belong the conceptions of *Cæsar*, *Faust*, *Mahomet*, the *Wandering Jew*, and *Prometheus*. The first was soon given up; of the second the first monologue, the dialogue between Faust and Mephistopheles, and part of the scenes with Gretchen, were now written. He has told us in his *Autobiography* what he intended to make of *Mahomet*. In five acts he was to show us how the purity of prophetic zeal is recognized by love, rejected by envy, sullied by human weakness, spiritualized by death. To write this drama he had studied the Koran through and through; only a few fragments were completed. Of the *Wandering Jew* very little remains to us. The design, conceived in Italy, of making a great work on the subject was never carried out. The *Prometheus* was completed in two acts. The monologue of the *Prometheus* included in the *Lyrical Poems*, was written at the same time; but it is doubtful whether it was intended to form part of the drama. These works are to be referred to the study of the ethics of Spinoza, for whom he now began to feel a deep reverence, which continued throughout his life. The calm repose of Spinoza's mind spread over his own like a breath of peace; his systematic and well-ordered reasoning was the best antidote to Goethe's passionate waywardness. Goethe now acquired a wider view of all the relations of the moral and natural world; he felt that he had never seen the world so clearly. His time at Frankfort was also largely occupied with art. His room was covered with the works of his pencil, and a number of poems on the subject of the artist's life arose from the same influence.

The summer of 1774 was spent in a journey to the Rhine. On July 12th Basedow, the educational reformer, came to Frankfort; three days afterward Goethe went with him to Ems, where he found Lavater, who had been with him in the previous month. The three went down the Lahn together, and reached Coblenz on July 18th. Here the famous dinner took place at which Lavater explained the secrets of the Apocalypse to a clergyman, Basedow demonstrated the uselessness of baptism to a dancing master, while Goethe, the worldling between the two prophets, made the best of his time with the fish and the chicken. They then went down the Rhine to Elberfeld, where Goethe found his old Strasburg friend Jung-Stilling, and back to Pempelfort, near Düsseldorf, the house of Fritz Jacobi, where Goethe also met Jacobi's wife Betty, his sister Charlotte, his aunt Johanna Fahlmer, and his friend W. Heinse. Their letters are full of the effect which he produced upon them.

Goethe returned to Frankfort at the beginning of

August. The autumn brought new friends, drawn to him by the fame of the newly published *Werther*. Among these was Klopstock, twenty-five years older than Goethe, and author of the *Messiah*, the acknowledged head of German poets. On December 11th Goethe was surprised by the visit of a stranger, whom he at first took for Fr. Jacobi. It was Karl Ludwig von Knebel, who was traveling with the two young princes of Saxe-Weimar, the reigning duke Karl August, then just seventeen, and his younger brother Constantine. They were on their way to France with their tutor, Count Görz, and they could not pass through Frankfort without making the acquaintance of the new genius who had risen upon their country. Goethe went to see them, was warmly received, and talked with them about the condition and prospects of Germany. This meeting decided the future course of Goethe's life. Knebel thought Goethe "the best of men, the most lovable of mankind." The princes invited him to visit them at Mainz, where they would stay longer than at Frankfort. The visit lasted from December 13th to 15th, when they went on to Carlsruhe, where the duke was to meet his intended bride. Goethe took the opportunity of reconciling himself with Wieland, who lived in Weimar. On his return he found Fräulein von Klettenberg dead. Frederike was lost to him, Charlotte, Maximiliane, and his sister married. Some attachment was a necessity of his nature. He now came under the influence of Lili Schönmann, the daughter of a rich banker, whose father was dead, but whose mother conducted the business, and held one of the most brilliant salons in Frankfort. This passion seemed to be of a more lasting nature than the others. Goethe was drawn into the whirl of society. He is described as moving in brilliantly-lighted rooms, in a gold-laced coat, passing from party to concert, from concert to ball, held captive by a fair-haired girl with a pair of bright eyes. Such was Goethe in the carnival time. To Lili's influence we owe several of his smaller poems, *Neue Liebe neues Leben*, *Herz mein Herz was soll das geben*, *Heidenröslein*, and two little vaudevilles, *Erwin und Elmire* and *Claudine von Villa Bella*. The first contains some pretty songs, notably "*Das Veilchen*," set to music by Mozart. It is founded on the ballad of *Edwin and Angelina*, in the *Vicar of Wakefield*. The latter half belongs to an earlier period, and is complete in itself. *Claudine von Villa Bella* has one good character, the prodigal son Crugantino; and the ballad which is sung at the crisis of the plot was written during the Rhine journey with Jacobi. To this period also belongs *Stella*, a comedy for lovers, a strange, wild play, full of extravagant passion. The weak-minded hero Fernando marries two wives, one after the other. They meet together in an inn, and he is reduced to extremity of misery. He loves them both, and they both love him. Finally, the first wife Stella surrenders her rights, and they agree all to live together. The play in this form suggested to Canning the parody of the *Rovers, or the Double Arrangement*. In 1806 Goethe altered the close by making Fernando shoot himself and Stella take poison. It is seldom performed, but Stella is a fine character for a great actress. It is said to be founded on an occurrence in the Jacobi family.

Neither family approved of the engagement between Goethe and Lili. Goethe's parents thought Lili too much of a fine lady; they had a suspicion, which was well founded, that her wealth had no very sure foundation. Frau Schönmann did not think that Goethe, with all his genius, would make a good husband for her child. Cornelia Schlosser was strongly opposed to the match. Goethe tore himself away, and went for a tour in Switzerland. His companions were the brothers



Stolberg, noisy, wild young nobleman, who in May had stayed at Goethe's house. They gave Goethe's mother the name of Frau Aya, which she ever afterward retained. On his journey Goethe visited the duke of Saxe-Weimar and his betrothed at Carlsruhe, his sister at Emmendingen, Lavater at Zurich. He bore with him the constant memory of Lili; he wore a golden heart which she had given him round his neck. He climbed the St. Gotthard on her birthday, and looked with longing eyes to the promised land of Italy. But a stronger power drew him home again, and he returned. At Strasburg he met his old friends, and saw Zimmermann, the writer on solitude. He showed him a profile of Frau von Stein who lived at Weimar, with which Goethe was enchanted.

He returned to Frankfort on July 20th. August was spent delightfully with Lili at Offenbach; his letters speak of nothing but her. September and the fair-time at Frankfort brought back his troubles. His position is described in the poem *Lili's Park*. He is the half-tamed bear who is held by magic bands among the birds and the fish, and yet sees a door left a little open for escape, and swears that he has the power to pass it. During this last period of his passion he translated part of the Song of Solomon. He wrote some scenes in *Faust*—the walk in the garden, the first conversation with Mephistopheles, the interview with the scholar, the scene in Auerbach's cellar. *Egmont* was also begun under the stimulus of the American rebellion. A way of escaping from his embarrassments was unexpectedly opened to him. The duke of Weimar passed through Frankfort both before and after his marriage, which took place on October 3d. He invited Goethe to stay at Weimar, and it was arranged that one of the duke's household, who was expected every day with a new carriage, should bring him with him. He took leave of everyone, including Lili. But the carriage did not come; a second leave-taking was impossible. He remained all day in the house working at *Egmont*, going out only at night. Once he stood by Lili's window, heard her sing his songs, and saw her shadow on the curtain. He could not linger longer in the town. He started for Heidelberg hoping to meet the carriage, determined if it did not come to go on to Italy. He was summoned hastily back by a messenger, found the carriage at Frankfort, and entered Weimar in the early morning of November 7, 1775. It was not for his happiness or for Lili's that they should have married. She afterward thanked him deeply for the firmness with which he overcame a temptation to which she would have yielded.

At this time the smaller German courts were beginning to take an interest in German literature. Before the Seven Years' War the whole of German culture had been French. Even now German writers found but scant acceptance at Berlin or Vienna. The princes of the smaller states, shut out from the great world of politics, surrounded themselves with literature and art, and with men who would be likely to give an interest to their lives. The duke of Brunswick had made Lessing his librarian at Wolfenbüttel, and had not objected to the publication of *Emilia Galotti*. Emmerich Joseph, the worldly elector and archbishop of Mainz, was devoted to Munich and the theater, and made his stage one of the best in Europe. The margrave of Baden had invited Klopstock to his court, and delighted to associate with himself the author of the *Messiah*, the "poet of religion and of his country." The duke of Würtemberg paid special attention to education; he promoted the views of Schubart, and founded the school in which Schiller was educated. Hanover offered a home to Zimmermann, and encouraged the develop-

ment of Schlegel. Darmstadt was specially fortunate. Caroline, the wife of the landgrave, had surrounded herself with a literary circle, of which Merck was the moving spirit. She had collected and privately printed the odes of Klopstock, and her death in 1774 seemed to leave Darmstadt a desert. Her daughter Louise, the youngest of eight children, seemed to have inherited something of her mother's qualities, veiled by a serious and retiring temper. She married on October 3, 1775, the young duke of Weimar, who was just of age. She reigned over that illustrious court, respected and admired, but repelled rather than attracted by its brilliancy and eccentricity. The place which she would naturally have occupied was taken by the duchess Amalia, mother of the grand-duke. She was of the house of Brunswick, and, after two years of marriage, had been left a widow at nineteen, with two sons. She committed their education to Count Görz, a prominent character in the history of the time. She afterward summoned Wieland to instruct the elder, and Knebel to instruct the younger. The *Deutsche Merkur*, founded in 1773, to diminish the influence of the school of Klopstock, gave Weimar importance in the literary world. The duchess was a great lover of the stage, and the best play writers of Germany worked for Weimar. The palace and the theater were burnt down in 1774, and the duchess had to content herself with amateurs. After her son's marriage, she lived in the simple country houses which surround the capital, the lofty Ettersburg, the low-lying Tiefurt, the far-seeing height of Belvedere. Each of these was awakened to new life by the genius of Goethe. The duke, eighteen years of age, was simple in his tastes, a hater of etiquette and constraint, true, honest and steadfast, fond of novelty and excitement, of great courage and activity; his impulses, rarely checked, led him rather to chivalrous enterprise than to undesirable excess.

Upon this society Goethe, in the strength and beauty of youth, rose like a star. From the moment of his arrival he became the inseparable and indispensable companion of the grand-duke. He subdued the affections of all he met with. Wieland said that his soul was as full of him as a dewdrop of the morning sun. He was, take him all in all, the greatest, best, most noble human being that God had ever created. The first months at Weimar were spent in a wild round of pleasure. Goethe was treated as a guest. In the autumn, journeys, rides, shooting parties, in the winter, balls, masquerades, skating parties by torchlight, dancing at peasants' feasts, filled up their time. Evil reports flew about Germany; the court of Weimar had a bad name; Klopstock wrote letters of solemn advice, and forbade his young friend Stolberg to accept an appointment which the duke had offered to him. We do not know, and we need not examine, how much of these reports was true. Goethe wrote to Klopstock that if Stolberg came he would find them no worse, and perhaps even better, than he had known them before. We may believe that no decencies were disregarded except the artificial restrictions of courtly etiquette. Goethe and the duke dined together and bathed together; the duke addressed his friend by the familiar *thou*. Goethe slept in his chamber, and tended him when he was ill. In the spring he had to decide whether he would go or stay. In April the duke gave him the little garden by the side of the Ilm, with its lofty roof, in which he lived for the next eight years. In June he invested him with the title, so important to Germans, of geheimlegationsrath, with a seat and voice in the privy council, and an income of £180 a year. By accepting this he was bound to Weimar forever. We may here mention the different grades of service through which Goethe



passed. In January, 1779, he undertook the commission of war; on September 5, 1779, he became geheim-rath; in September, 1781, he received an addition to his salary of £30. This was afterward raised by £60 more, and in 1816 he received £450, with an additional allowance for the expense of a carriage. In April, 1782, he was enobled by the emperor, and took for his arms a silver star in an azure field; in June of the same year he became president of the chamber *ad interim*. We know that Goethe devoted himself with industry and enthusiasm to the public business; he made himself acquainted with every part of his master's territory; he did his best to develop its resources; he opened mines and disseminated education; he threw himself with vigor into the reconstruction of the tiny army. A complete account of his labors cannot now be given. We shall one day probably find that Goethe cannot be fairly charged with want of patriotism, or coldness to the national interest, and that his apparent indifference to the rising of 1813 must be considered in connection with his resistance to the encroachments of Austria at an earlier time.

Besides numerous visits to the court of the Thuringian princes, sojournings at Dornberg and at Ilmenau, that retired nook of the Weimar fatherland which still attracts many a pilgrim lover of Goethe, the first ten years at Weimar were interrupted by longer journeys. One of these was the winter Harz journey in December, 1777, undertaken suddenly to make the acquaintance of Plessing, a self-torturing hypochondriac, who had written to the poet for advice. With Goethe's help Plessing recovered from his melancholy, visited him at Weimar, and entertained him as professor at Duisburg on his return from the campaign in France. A visit to Dessau inspired the improvements of the park and grounds at Weimar, which now make it so attractive. The close of 1779 was occupied by a winter journey to Switzerland, undertaken with the duke and a small retinue. Two days were spent at Frankfort with Goethe's parents. Sesenheim was visited, and left with satisfaction and contentment. At Strasburg they found Lili happily married, with a new-born child. At Emmendingen Goethe stood by his sister's grave, and saw her successor Johanna Fahlmer, Jacobi's aunt. The Swiss journey began at Basel. The chief object of it was to forward the health and education of the young duke. It was a bold plan to execute in October and November. From Bern they made the tour of the Bernese Oberland. From Geneva, by the advice of De Saussure, they visited Mont Blanc and the valley of Chamouni; they crossed the Furka, not without danger, in the middle of November, descended the St. Gotthard to Lucerne, and visited Lavater at Zurich, the seal and summit of their tour. From this time Lavater lost his influence over Goethe, and in 1786 he would gladly have run away from Weimar to avoid him. In December they went by the Lake of Constance and the falls of the Rhine to Stuttgart, where, on December 14, Goethe saw Schiller for the first time. He was a student at the academy, and in Goethe's presence received the prize.

The return to Weimar, on January 13th, was the beginning of a new era. The period of genius and eccentricity was at an end; that of order and regularity succeeded. As an outward sign of the change, the duke cut off his pigtail, an example which was long without imitators. Wieland said that the Swiss winter journey was the greatest of Goethe's dramas. In the same serious mood Goethe began to write history. He chose for his subject Duke Bernhard of Saxe-Weimar, the knight-errant of the Reformation. He spent much time and trouble in collecting materials, but at length reasonably concluded that his strength lay elsewhere. At this

time also he began to write *Tasso*, and adapted the *Birds* of Aristophanes to modern circumstances. His deeper thoughts were concentrated in *Wilhelm Meister*. Countess Werther, the sister of the great minister Baron von Stein, whom he visited at Neunheiligen, was transferred in living portraiture to its pages. His efforts for the development of the duke's dominion naturally led him to the study of science. The opening and direction of mines induced him to study geology; the classification of ancient forms of life led him to osteology and anatomy. Goethe was always fond of children. The young Herders and Wielands spent much time in his garden, sometimes digging for Easter eggs which had been carefully concealed. In the spring of 1783 Fritz, the son of Charlotte von Stein, then ten years old, came to live with him in his garden house. In the autumn they took a journey together in the Harz. At Ilmenau was written the touching poem of that name on the duke's birthday. Goethe reviews in it their common friendship and activity as far as it has yet gone, and a few days afterward, as he slept in the hut on the Gickelhaln, he wrote in pencil the world-known lines in which he anticipates for himself that rest and silence which then held enchained the summits of the hills and the birds of the wood. In the following year another journey was undertaken in the Harz for the study of mineralogy. But this was only a relaxation from more serious affairs. In 1785 the Fürstenbund or league of princes was formed, under the supremacy of Frederick the Great, to resist the ambition of Austria under Joseph II. The duke of Saxe-Weimar took an important part in forming this league, and in the negotiations which preceded it. Goethe was his indispensable adviser, and must on this occasion, if not on others, have taken a keen interest in politics and in the independence of Germany.

The year 1786 marks an epoch in Goethe's life. He had now been ten years in Weimar, and he must have felt that his own inward development, and the work which he was most fitted to do in the world, were not advancing as favorably as they should. He had written little of first-rate importance. His *Lyrics* were of intense beauty and of deep meaning, but they were short and fugitive. He had brought with him from Frankfort the sketches of *Faust* and *Egmont*, but little had been done to them since. His occasional writings for the amateur theater, or for court festivities, were not such as to add to his solid reputation in Germany. *Iphigenie* was the one great work of poetry which belongs entirely to this period, but that had not received its final form. *Tasso* was conceived, but only two acts were written, and these in prose. *Wilhelm Meister* is the most exact expression of this portion of Goethe's life; but loftily as it now towers above the level of his dramas, it did not then satisfy the author, nor was it in a state to be published. For the completion of these works Goethe required leisure and repose, impossible to obtain in the distraction and pleasures of the court. This became more apparent to him as he set himself to collect his scattered writings. Four volumes were soon completed, but the preparation of the other four convinced him how much labor many of his poems still required for perfection.

Of still deeper interest and importance were his scientific researches. In these he aspired to detect the secrets of nature; he succeeded in seeing, as in a vision, the great scheme of evolution applied to all phenomena of the natural and moral world, which the labors of many workers have revealed to us in our own day. He longed for time and leisure to perfect these ideas, to base them on solid fact. Goethe has not added much of positive value to the treasury of scientific truth, but he deserves the credit of having discerned the right method



of inquiry when it was obscure to many, and of having thrown that glow of imagination over dry and technical inquiry, without which no great and important discoveries can be made. His inquiries into the nature of light belong to a later time. He began with physiology under the auspices of Lavater. From this he was led to the study of anatomy, and especially to the comparison of the skeletons of men and animals. In this department he made a real discovery, that the intermaxillary bone which exists in the lower animals is found in the human subject in a rudimentary state—that it is seen distinctly in youth, but as years advance is united with the body of the skull. The discovery that the skull itself is only a development of the vertebræ of the spine was made a little later. He was led to this further step by picking up the head of a sheep on the shore of the Lido at Venice. The care of his garden cottage naturally led him to the study of plants. He soon found himself attracted to wide and comprehensive generalizations. The *Metamorphoses of Plants* was not published till 1790, but the idea which had possession of his mind was a solid contribution to the science of botany. Goethe sought to discover an original or standard flower, from which, as from a Platonic ideal type, all existing flowers were deflections and aberrations. In this he followed an unscientific method, but he clearly saw that all the different parts of the plant, except the stem and the root, might be regarded as modifications of the leaf; that leaf, calyx, corolla, bud, pistil, and stamen were all referable to the same type; and that whether a plant produced leaves, or flowers, or fruit, depended on the differentiation of the nutrition which it received. Less fortunate were his speculations in geology, to which he devoted a very large portion of his time and thoughts. It is something that he recognized the importance and reality of that science, then in its infancy, which has had to undergo more than its due share of obloquy and distrust. But he was of necessity a follower of Werner, who based his classifications of rocks rather on the minerals which they contained than upon an examination of the fossil remains of organic life. All these causes contributed together to one end. His desire to complete the great poetical works which he had begun, to disentangle his life from the complexities which had entwined themselves round it, to give a fair trial to his impulses toward art, to afford opportunity for the careful and systematic interrogation of nature, and, above all, a longing to possess his soul in peace, and solemnly to probe in silence the depths of his own being, conspired together to drive him from Weimar to the land which he had yearned after from boyhood. The resolution, slowly formed, was boldly executed. In the summer of 1785 he had visited Carlsbad for the first time, passed a pleasant month in the company of the duchess Louise, Herder, and Frau von Stein. In July, 1786, he paid it a second visit. After five weeks of brilliant society, very favorable to his health, spent in revising his works for the press, he stole secretly away. The duke alone knew that he designed an absence of some duration. In the strictest incognito, in the guise of a German merchant, he drove alone to the land of the citron and the orange.

Goethe's Italian journey, the most momentous epoch in the development of his intellectual life, lasted from September 3, 1786, to June 18, 1788. Assuming the common German name of Müeller, in the strictest incognito he journeyed by way of Munich, where he studied the picture gallery and the collection of antiquities; by the lake of Garda, where he began his metrical version of the *Iphigenie*; by Verona, where he saw the first specimen of Roman building in Italy, in the stupendous amphitheater; by Vicenza, where he was

attracted by the grace and harmony of the classical Palladio; by Padua, where he neglected the frescoes of Giotto, but rose to a clear conception of the form of the *original plant* by the marks on the leaves of a palm in the botanical garden; to Venice, where for the first time he was able to taste the charm and richness of southern life. As he proceeded farther, Ferrara spoke to him of Tasso; Bologna showed him the great masters of the academic school who have now grown pale and dim before the predecessors of Raphael; Florence interested him a little; Assisi drew his attention, not to the triple church of Saint Francis, the unrivaled museum of religious art, but to the little ruined temple which no modern traveler would notice but for the name of Goethe; Spoleto again delighted him with the remains of ancient architecture. He reached Rome on October 28th. His first stay was till February. The constant companion of his studies was the painter Tischbein, who helped him to disentangle the many difficulties of the old Rome and the new. He lived chiefly among the German artists and men of letters who frequented the Caffé Greco. Among these were Angelica Kaufmann and Moritz, who deepened his knowledge of German versification, and prepared him for the composition of *Iphigenie*. Although Goethe occupied himself chiefly with drawing, he was able to announce on June 6th, that his work was finished. The second *Iphigenie*, written in verse, was the first important fruit of the Italian journey. It is in very strong contrast with *Götz von Berlichingen*. It is written in the strictest classical form. Although based on the *Iphigenia in Tauris* of Euripides, it has little in common with it.

Toward the end of February Goethe left Rome for Naples. Here he was attracted less by the remains of antiquity, even the new revelations of Herculaneum and Pompeii, than by the prospects of nature, the bay, the islands, the volcano, the thousand beauties which make the gulf unrivaled in the world, and by the multitudinous and teeming life which throngs the endless quays that line the shore. Sorrento stimulated him to the revisal of *Torquato Tasso*, but he did not complete the drama till his return from Italy. It did not appear in print till the spring of 1790. The play had a special fascination for him as a picture of his own distracted life. He could depict with feeling the struggle between the actual and the ideal, the ill-assortment of a passionate poet with the jealous and artificial environment of a court. At the end of March Goethe sailed to Sicily; rolled up in his cloak he meditated the composition of his *Tasso*. Sicily struck him, as it must strike all travelers who have studied the ancient world, as a revelation of Greece. It is, if one may say so, more Greek than Greece itself. Its mountains, streams, trees, flowers, the form of its boats and pottery, the habits of the people, the quivering smile of the bright blue sea fringed with golden sand, represent completely the Greece of the *Odyssey* and of the choruses of Euripides. Goethe was overmastered by this powerful influence. He sketched and began *Nausicaa*, the story of the *Odyssey* in dramatic form, which always remained a fragment. He returned to Rome in June. The rest of the year was spent in the city and its neighborhood, in the serious study of drawing, for which unfortunately he had but little talent, and in the composition of *Egmont*, a work begun with the approval of his father in the early Frankfort days. It was finished in September, 1787, and appeared in the Easter of the following year. The carnival of 1788 was of importance to his experience. He wrote some scenes of *Faust*: especially the scene in the witches' kitchen was composed in the Borghese gardens. At the end of April he took a sad farewell of Italy, and arrived at Weimar in the middle of June.



From this time his life takes a new color. He had learned in Italy not only new principles of art,—not only that a work of art, whatever of Gothic ornament it may possess, must be solid, firm and simple in its construction as a Grecian temple,—but he had also learned that life itself should be a work of art. He was determined henceforth to be himself, to break the bonds which had confined him and the distractions which had confused him, to possess his soul sacred and inviolable for the purposes of his life. He was relieved of the presidency of the chamber and of the war commission, but in a manner which did him the greatest honor. In the autumn of 1788, walking aimlessly through the park, he met Christiane Vulpius, a young girl who presented him with a petition in favor of her brother. She had golden curling locks, round cheeks, laughing eyes, a neatly rounded figure; she looked, as has been said, “like a young Dionysus.” Goethe took her into his house, and she became his wife in conscience, and the mother of his children. He did not marry her till 1806, when the terrors of the French occupation made him anxious for the position of his eldest son. She had but little education, and he could not take her into society; but she made him a good and loving wife, and her quick mother-wit made her available as an intellectual companion. To these days of early married life belong the Roman elegies, which, although Italian and pagan in form, in color and in sensuality, were written in Germany from home experiences.

In the spring of 1790 he traveled to Venice to meet the duchess Amalia. The Venetian epigrams, still more outspoken in sensuality than the Roman, were the fruit of this journey. In the autumn of the same year he accompanied the duke to Silesia, the first of those military journeys which strike so discordant a note in the harmonious tenor of his existence. The year 1791 offered a quiet contrast to the movement of the year before. He began to take a more special interest in the university at Jena, in which his young friend Fritz von Stein had now entered as a student, and his time was more and more occupied with the study of colors, the least happy and successful of his scientific labors. In the autumn of 1791 Goethe was able to devote himself regularly to a task which had informally occupied his first years in Weimar. The new theater was completed, and Goethe was made director of it. It was in this capacity that he was best known to the citizens of Weimar. He had the final decision on every detail of piece, scenery, and acting; in later years his seat was in a large arm-chair in the middle of the pit, and applause was scarcely permitted until he gave the signal for it. The German stage owes perhaps as much to Goethe as to Lessing. The *répertoire* of the Weimar theater was stocked with pieces of solid merit which long held their place. Shakespeare was seriously performed, and the actors were instructed in the delivery of blank verse. Stress was laid on the excellence of the *ensemble* against the predominance of particular stars. The theater was considered as a school not only of elevating amusement but of national culture. Goethe wrote the *Gross Cophta* for the Weimar stage, a piece founded on the history of Cagliostro and the diamond necklace. He was fascinated by the story as a foreboding of the coming horrors of the Revolution. In these events he was destined to take a more active part than he expected. In August, 1792, he accompanied the duke to the campaign in the Ardennes. Passing by Frankfort, where he visited his mother, he joined the allied armies at Longwy. He beguiled the tedious siege of Verdun by writing an account of his theory of colors in a leaky tent; and on the disastrous day of Valmy, which he recognized as the birth of a new era,

he sought the thickest of the fight that he might experience the dangerous rapture of the cannon-fever. He retreated with the Prussian army, spent five weeks with his friend Jacobi at Pempelfort, and on his return to Weimar at the end of the year found that the duke had built him a spacious house in the square where the joint statues of Goethe and Schiller now stand, in eternal memory of their friendship. In 1793 he went with his master to the siege of Mainz. He continued his optical studies during the bombardment, witnessed the marching out of the garrison, and was one of the first to enter the conquered town. He received leave to withdraw, and went to his mother at Frankfort, and persuaded her to sell the old house and its contents, and to provide a more convenient home for her old age. There was some talk of her coming to Weimar. In the autumn of this year the duke left the Prussian service, and Goethe could look forward to a period of peace. He was chiefly occupied with the management of the theater, and for this he wrote two pieces, both of which had reference to the politics of the time. The *Bürger-general* is a satire on the Revolution, and was long a stone of offense to Goethe's friends, who thought he should have hailed with delight the birth of a new era.

Thus far he had produced but little since his return from Italy. He was now to undergo the most powerful influence which had as yet affected his life. His friendship with Schiller was now to begin, an alliance which, in the closeness of its intimacy and its deep effect on the character of both friends, has scarcely a parallel in literary history. If Schiller was not at this time at the height of his reputation, he had written many of the works which have made his name famous. He was ten years younger than Goethe. The *Räuber* plays the same part in his literary history as *Götz* plays in that of Goethe. This had been followed by *Fiesco* and *Kabale und Liebe*. The second period of Schiller's life had begun with his friendship with Körner, and his residence in Saxony. Here he wrote the *Hymn of Joy*, and completed *Don Carlos*. In 1787 he settled at Weimar. He found the place deserted, the duke in the Prussian camp, Goethe in Italy. He applied himself to history, wrote the *Revolt of the Netherlands*, and studied the literature and art of Greece. In 1789, mainly upon Goethe's recommendation, he was made professor of history at the university of Jena, although he was afraid lest the scholars should discover that they knew more history than the teacher. He made a successful marriage, and worked seriously at his *History of the Thirty Years' War*. In 1794 Schiller had arranged with the publisher, Cotta of Augsburg, whose name is from this time indissolubly connected with the history of German literature, for the production of a new literary journal. It was to be called the *Horen*, and the most distinguished German writers were to contribute to it. Goethe accepted the invitation willingly. The work was designed to mark an epoch in German taste, and it did so. It soon had two thousand subscribers. Among those who promised to contribute were not only Matthisson, Herder, Knebel, Fritz Jacobi and Gleim, but the brothers Humboldt, the veteran Kant, the youthful Fichte, who had just begun to lecture in Jena, and, at a later period, the brothers Schlegel. Schiller opened the first number of the journal with his letters on the “Æsthetic Education of the Human Race.” Goethe contributed the “Unterhaltungen deutscher Ausgewanderten,” a series of stories told by a number of German emigrants who had been driven to cross the Rhine by the invasion of the French. The most remarkable of these stories is the “Märchen,” a wild and mystic tale, which has been the subject of as much controversy and of as many interpretations as the second part of *Faust*. Goethe also published in



the *Horen* the "Römische Elegien," the flavor of which even Karl August found a little too strong. The first effect of Schiller's influence on Goethe was the completion of *Wilhelm Meisters Lehrjahre*. He had conceived the plan of the work twenty years before, and the first six books had been written before the Italian journey. It was now finished by the addition of two more books. It stands in the first rank of Goethe's writings. He has aimed in it to attain to perfect objectivity of tone, to represent men as they are, and to pass no judgment upon them. The hero passes with weak irresolution through a number of ordinary circumstances, apparently the sport of fortune and the play-thing of chance, yet all these experiences have their definite result in the training of his character. Like the son of Kish, he goes forth to seek his father's asses and finds a kingdom. The unearthly charm of the child Mignon, the dark fate which shrouds the aged harper like the doom of Ædipus, the uncertain yearning after a happier home in brighter climes, give a deeper undertone to the prevailing lightness of the story. The style is exquisitely soft and flowing. It has the sweetness and simplicity of *Werther*, but is more mellow and more mature. The sixth book is occupied with the *Bekenntnisse einer schönen Seele*, a piece of the autobiography of Goethe's early friend Fräulein von Klettenberg, altered to suit its new surroundings. The *Musen Almanach* for 1796, edited by Schiller, was enriched by some of Goethe's most exquisite poems — *Die Nahe des Geliebten*, *Meeres Stille*, and *Glückliche Fahrt*. The storm of criticism which was aroused by the *Horen*, and the little success which, after the first numbers, it met with from the public, determined the two friends to retaliate upon their aggressors. The poems of Martial contain a number of epigrams written in two lines, describing the numberless little presents or *xenia*, which it was customary for friends to exchange at Rome during the time of the Saturnalia. The name was borrowed by the two poets, and the *Xenien* was a convenient vehicle for the expression of their opinion on every subject. The newspapers of the day were the first object of attack, but they soon went further afield. The epigrams were written in Schiller's rooms at Jena. It is impossible to fix the authorship of the *Xenien*; one conceived the idea, the other wrote the lines; one wrote the hexameter, the other the pentameter; they intended the authorship as well as the ownership of the copyright to be one and indivisible. Notwithstanding this, the collection has been broken up. There is no guarantee that the epigrams which appear in the separate works of either poets were really written by the authors to whom they are ascribed; some are reprinted in the works of both; some have remained unprinted altogether. They appeared in the *Musen Almanach* for 1797, together with the Venetian elegies mentioned above. It is needless to say that they roused the writers whom they attacked to unspeakable fury, and were the occasion of a copious literature. A more solid result of the friendship between the poets was the production of *Hermann und Dorothea*. It is a German idyll; the story is taken from the sufferings of Lutherans driven out in the early part of the eighteenth century from the province of Salzburg, but Goethe has given it the character of his own time. He had seen much of the suffering produced by the French Revolution, and he wished this poem to be a reflection in a tiny mirror of the storms and convulsions of the great world. In its literary form it is a descendant of Voss' *Luise*. It was conceived at Ilmenau in August, 1796, and finished in the following spring. Schiller tells us how it was composed with extraordinary ease and rapidity. During nine days Goethe produced 150 lines a day. The lines

thus hastily written underwent a careful revision. Contemporaneous with *Hermann und Dorothea* is the production of *Wallensteins Lager* by Schiller, which was written with the advice and assistance of his brother poet. The completion of this cycle of plays falls two years later.

The year 1797 is the year of ballads. In his garden house at Jena, Schiller worked diligently at this vein, that perhaps for which he was best suited, and in which he most nearly rivals Goethe. Goethe wrote *Die Braut von Korinth*, *Gott und die Bayadere*, and *Der Zauberlehrling*; and the whole collection was published in the *Musen Almanach* for 1798. The latter half of this year was occupied with a tour in Switzerland. Before its commencement he visited his mother at Frankfurt for the last time, and presented to her his wife and his son. It was a year of extraordinary activity. Besides the ballads and his researches in the morphology of plants and insects, he translated a great part of the autobiography of Benvenuto Cellini, wrote a number of essays on the question of æsthetics, and worked at his long neglected *Faust*. Of this he wrote the dedication, the *Prologue in Heaven*, and the *Golden Marriage of Oberon and Titania* — so powerful was the effect of intellectual sympathy and stimulus. The six years which succeeded Goethe's return from his third Swiss tour, although they embrace the period in which he and Schiller were in daily coöperation, have left us little of permanent worth from the older poet. On the other hand, they are the years of Schiller's greatest activity. The great trilogy of *Wallenstein*, perhaps the highest point of Schiller's genius, was followed by *Maria Stuart*, the *Jungfrau von Orleans*, the *Braut von Messina*, and *Wilhelm Tell*. From the end of 1799 Schiller was permanently settled in Weimar; a dramatic school was founded, and the representation of these classical dramas was the glory of the Weimar stage. During these years Goethe was occupied with *Faust*, with his researches into the theory of colors and of biological development, with the conduct of the theater and the practical encouragement of art. In 1798 the *Horen* died a natural death, and was succeeded by the *Propylæen*, a journal of literature and criticism, which, although it contained many essays by Goethe, never exceeded a circulation of 300. In the spring 1799 the study of Homer incited Goethe to sketch a long epic poem on the subject of Achilles. Schiller did his best to encourage the work. The first canto was rapidly completed, but it had no successor. Goethe contented himself with translating the works of others, and prepared the *Mahomet* and *Tancred* of Voltaire for the Leipsic stage. In the first days of the new century he suffered a dangerous attack of scarlatina. His friends feared for his life. After his recovery he sketched out what was the most important work of these years, a trilogy on the subject of the French Revolution; of this only the first part, the *Natürliche Tochter*, was completed. The play was performed at Weimar on April 2, 1803. Two masterpieces of Schiller — the *Braut von Messina* and the *Jungfrau von Orleans* — preceded and followed it by a few weeks. At the end of this year Madame de Stael arrived in Weimar accompanied by Benjamin Constant. She had heard of the fame of this new Parnassus, and she was bent on proclaiming the intellectual superiority of Germany to the world. Goethe at first fled from her, as Byron did at a later period. He hid himself in Jena, but was recalled by order of the duke. The result of the conversations in the salons of Weimar is contained in her book *De l'Allemagne*. In March she was suddenly recalled by the death of her father, the minister Necker. Goethe was at this time the center to which the most distinguished men of all kinds in Germany



naturally turned. He was most intimate with Zelter the musician, with whom he maintained a full correspondence; with Wilhelm von Humboldt, the statesman-scholar; with F. A. Wolf, the founder of the science of philology; with Gottfried Hermann, the best authority on Greek meters. But the friendship which was worth all these was soon to be severed. In the beginning of 1805 Goethe was convinced that either he or Schiller would die in that year. In January they were both seized with illness; Schiller had finished his *Phædra* and begun to work at his *Demetrius*. Goethe was translating the *Neveu de Rameau* of Diderot. Schiller was the first to recover, and visiting Goethe in his sick room, fell on his neck and kissed him with intense emotion. On April 29th they saw each other for the last time. Schiller was on his way to the theater whither Goethe was too ill to accompany him. They parted at the door of Schiller's house. Schiller died on the evening of May 9th. No one dared to tell Goethe the sad news, but he saw in the faces of those who surrounded him that Schiller must be very ill. On the morrow of Schiller's death, when his wife entered his room, he said, "Is it not true that Schiller was very ill yesterday?" She began to sob. He then cried, "He is dead!" "Thou hast spoken it thyself," she answered. Once more he cried, "He is dead!" and turning aside covered his weeping eyes with his hands. He at first intended to have completed *Demetrius* as a memorial of his friend, but a happier inspiration was to arrange a performance of Schiller's great poem of *The Bell*, and to crown it by an epilogue. Since that time Schiller and Goethe have been inseparable in the minds of their countrymen, and have reigned as twin stars in the literary firmament. If Schiller does not hold the first place, it is at least true that he is more beloved, although Goethe may be more admired. It would be invidious to separate them. But it is evident that the best fruits of Schiller's muse were produced when he was most closely under Goethe's influence, and the foreign student of German culture has ground for believing that at some future time the glory of the lesser luminary will be absorbed in that of the greater, and the name of Goethe will represent alone and unrivaled the literature of his age and country.

Schiller was happy in the occasion of his death. He did not see the troubles which immediately afterward burst upon Thuringia. On October 14, 1806, the battle of Jena was fought. The court had fled from Weimar; only the duchess Louise remained. In the evening of the defeat Weimar was plundered by the conquering troops. Many of Goethe's friends lost everything they possessed. His property and perhaps his life was saved by the firmness of Christiane, and afterward by the billeting of Marshal Augereau in his house. On the 15th Napoleon entered the town, but Goethe did not go to see him. The duchess obtained her husband's pardon by her entreaties. It was not till the autumn of 1808 that Napoleon and Goethe, perhaps the two greatest men then living in Europe, met and conversed. It was at the congress of Erfurt, where the sovereigns and princes of Europe were assembled. Goethe's presence was commanded by the duke. He was attracted at least as much by the prospect of seeing Talma as of meeting Napoleon. He was invited to an audience on October 2d; Talleyrand, Berthier and Savary were present. The emperor sat at a large round table eating his breakfast. He beckoned Goethe to approach him, and said to him, "Vous êtes un homme!" He asked how old he was, expressed his wonder at the freshness of his appearance, said that he had read *Werther* through seven times, and made some acute remarks on the management of the plot. Then, after an interruption, he said that tragedy

ought to be the school of kings and peoples; that there was no subject worthier of treatment than the death of Cæsar, which Voltaire had treated insufficiently. A great poet would have given prominence to Cæsar's plans for the regeneration of the world, and shown what a loss mankind had suffered by his murder. He invited Goethe to Paris; that was the center of great movements; there he would find subjects worthy of his skill. They parted with mutual admiration. The bust of Napoleon was a prominent ornament in Goethe's study.

In the same year, 1808, an edition of Goethe's works in thirteen volumes was published by Cotta at Tübingen. It is remarkable as containing the first part of *Faust* in its complete form. The principal portion of the drama had already been published as a fragment in 1790. It had then attracted but little attention. Heyne wrote of it: "There are fine passages in it, but with them there are such things as only he could give to the world who takes other men to be blockheads." Wieland and Schiller were apparently dissatisfied with it. It had, perhaps, the appearance of patchwork, as it was made up of fragments which had been written at very different periods of his life. The idea of writing *Faust* seems to have come to Goethe in his earliest manhood. He was brooding over it at the same time with *Götz von Berlichingen*, but at Strasburg he spoke to Herder of neither. He apparently began to write it down at the same time as *Werther*, in 1774, and we find mention of its progress in the two following years; indeed, all the important parts of the fragment which appeared in 1790 were known to Jacobi before 1776. He took the work with him to Italy, where he added little to it except the scene in the witches' kitchen. The dedication, the *Prologue in Heaven*, which presents to the reader the idea of the whole work, the prelude on the stage copied from the Indian drama, the lyrical intermezzo, the scene with Wagner before the city gate, and the scene with Mephistopheles in the study were written before 1800. In that year he was busy with *Helena* for the second part, and he added nothing afterward to the first except the *Walpurgis Night* and the scene of Valentine's death. *Faust* justly stands at the head of all Goethe's works, and it deserves a very high place among the best works of every age. Founded on a well-known popular tale, indebted for its interest and pathos to incidents of universal experience, it deals with the deepest problems which can engage the mind of man. In this combination of qualities it is perhaps superior to any one of Shakespeare's plays. The plot is as simple and as well known to the audience as the plot of a Greek tragedy. The innocence and the fall of Gretchen appeal to every heart; the inward struggles of Faust, like those of Hamlet, and the antagonism of the sensual and moral principles, interest the reader just in proportion as his own mind and nature have been similarly stirred. Each line is made to stand for eternity; not a word is thrown away; the poem has entered as a whole into the mind and thought of modern Germany; nearly every expression has become a household word. Characters are sketched in a single scene; Valentine lives for us as clearly as Faust himself. Deeper meanings are opened up at every reading, and the next age will discover much in it which is concealed from this. Goethe, writing of *Faust* in his eightieth year, says with truth, "The commendation which the poem has received far and near may be, perhaps, owing to this quality, that it permanently preserves the period of development of a human soul which is tormented by all that afflicts mankind, shaken also by all that disturbs it, repelled by all that it finds repellent, and made happy by all that it desires. The author is at present far removed from



such conditions; the world likewise has to some extent other struggles to undergo; nevertheless the state of man, in joy and sorrow, remains very much the same, and the latest born will still find cause to acquaint himself with what has been enjoyed and suffered before him in order to adapt himself to that which awaits him."

In 1809 he finished *Die Wahlverwandtschaften* (The Elective Affinities), a story which is always cited to prove the immoral tendency of his works. A married couple, Edward and Charlotte, are thrown into constant companionship with two unmarried persons, the Captain and Ottilie. A cross attraction takes place similar to that which is often seen in chemical experiments. Edward unites himself with Ottilie, Charlotte with the Captain. The psychological changes by which this result is produced are portrayed with a masterly hand. The moral may be held by some to exalt the preponderance of fatality in human affairs, and the uselessness of contending against irresistible circumstances. Others may believe that the story is intended to show the disastrous calamities which may be wrought by a weak and self-indulgent will. Ottilie, though she cannot resist her passion, has strength enough to starve herself to death; Edward is the prototype of Arthur Donnithorne and Tito Melema. The work is replete with earnest purpose and terrible warning.

In 1810 Goethe finished the printing of his *Farbenlehre* (Theory of Colors), a work which had occupied his mind ever since his journey to Italy. His theories were rejected and disregarded by his contemporaries, but he left them with confidence to the judgment of posterity. Goethe's labors in this domain fall into two natural divisions—one in which he tries to prove that the hypotheses of Newton are unsatisfactory, and another in which he promulgates a theory of his own. In his first work, published in 1791 and 1792, he describes with great accuracy and liveliness the experiments which he has made. They consist chiefly of the appearances presented by white discs on a black ground, black discs on a white ground, and colored discs on a black or white ground when seen through a prism. There are two points which he considers fatal to Newton's theory,—that the center of a broad white surface remains white when seen through a prism, and that even a black streak on a white ground can be entirely decomposed into colors. The scientific friends to whom he communicated these observations assured him that there was nothing in them opposed to Newton's theory,—that they were even confirmation of it. He would not be convinced, and took no pains to acquire that exact knowledge of mathematics and geometrical reasoning without which the more abstruse problems of physical optics could not be intelligible. He went on further to formulate a theory of his own. His views on the subject are contained in their shortest form in a letter addressed to Jacobi from the camp at Marienburg in July, 1793. They are divided into six heads, of which the following is an abstract. (1) Light is the simplest matter we have knowledge of, the least capable of analysis, the most homogeneous. It is not a compound body. (2) Least of all is it compounded of colored lights. Every colored light is darker than colorless light. Brightness cannot be compounded of darkness. (3) Inflection, refraction, reflection, are three conditions under which we often observe apparent colors, but they are rather occasions for their appearance than the cause of it. (4) There are only two pure colors, blue and yellow; red may be regarded as a property of both of them. There are two mixed colors, green and purple; the rest are gradations of these colors, and are not pure. (5) Colorless light cannot be produced out of colored lights, nor white from colored pigments. (6) The colors which appear to us arise solely

out of a modification of the light. The colors are excited in the light, not developed out of the light. These views he afterward extended and explained, but very slightly modified. In Goethe's opinion, yellow was light seen through a thickened medium; blue was darkness seen through an illuminated medium; all other colors were derived from these two. The theory of the *Farbenlehre* has not yet received the recognition which Goethe anticipated for it. In his own day he had some adherents,—the most distinguished perhaps was the philosopher Hegel, whose views, however, of natural philosophy have caused many inquirers to recoil from his theory of metaphysics. Goethe complained that no physicist believed in him, and as that is still true in an age which has been devoted more than any other to physical inquiries, we may conclude that the principle upon which his theories are based is radically wrong.

The year 1809, in which *Die Wahlverwandtschaften* was written, was for Goethe the beginning of a new era. He was then fresher and brighter than he had been for ten years before. He had lived through a troubled period of oppressive sorrow. The death of Schiller, the violation of his beloved Weimar, the deaths of the duchess Amalia and of his mother, his own bodily and mental sufferings, had given a tone of sadness to his poetry. As if to put the finishing stroke to the efforts of his life, he married the mother of his children, arranged and published his collected works, and completed his theory on colors. The unfinished drama of *Pandora* is a symbol of this time. The part which is completed refers only to past experiences of sadness; the continuation was to have lifted the curtain of future hope.

It was natural at the beginning of a new course of life that Goethe should write an account of his past existence. The study of his collected poems made it apparent to him how necessary it was to furnish a key by which they might be understood. These various causes led to the composition of *Dichtung und Wahrheit* (Poetry and Truth), an autobiographical history of the poet's life from his birth till his settlement at Weimar. This work is the cause of much embarrassment to the poet's biographers. Where it ought to be the most trustworthy source of information, it is most misleading. It is probable that Goethe intended it to be an accurate and circumstantial account of his life. But the inner life of an individual is more clear to him than the outer. The stages of our self-development are better remembered than the exact circumstances which produced them, still less than the order of time in which they followed each other. Goethe took pains to ascertain facts which he had forgotten. But he was so conscious that imagination would play a large part in the composition that in the title he gave poetry the precedence before truth. The indefatigable industry of German investigation has laid open before us every detail of the poet's life and every phase of his feeling. *Dichtung und Wahrheit*, if it has lost its rank as a history, still keeps its place as a classic. The simple loving delineation of the childhood of genius is as fresh as ever, and is of more universal interest from being less particular. The first five books of this autobiography appeared in 1811, the next five in 1812, the third installment at Easter, 1814, and the conclusion after Goethe's death. The period during which this was his principal work witnessed the greatest political event of the first half of our century, the rising of the German people against the power of Napoleon. In this Goethe took no share, and with it he apparently felt little sympathy. He made no impassioned orations to his countrymen like Fichte: he wrote no inspiring lays like Körner. The



ballads which he composed in 1813 are harmless enough, — *Der wandelnde Glocke*, *Der getreue Eckhart*, *Der Todtentanz*. He saw Stein and Arndt at Dresden in 1813, but disappointed them by his impassive manner. The reasons for this apparent coldness are perhaps more simple than they appear at first sight. Goethe was a man of thought rather than of action. Although a fair portion of his long life was given to the practical business of his adopted country, his heart was always in speculation or artistic production. While inspecting mines he was spinning theories of geological formation; while working for the war commission he gladly ran away to the castle of Dornburg to bury himself among his deserted papers. The pressure of court business at Weimar drove him to the solitude of Italy. In the defiles of the Argonne, and in the trenches before Mainz, he was scheming and arranging his theory of colors. A bombardment was valued by him less as an attack upon the enemy than as a series of interesting experiments in optics. Added to this natural indifference to the details of human affairs was his belief in the predominance of force, and in the necessary evolution of the history of the world. Napoleon was to him the greatest living depository of power. Nations, whether conquered or victorious, separated or united, obeyed a common law against which individual will strove in vain. Goethe was thus incapacitated for politics, both by his qualities and his defects. This habit of abstract contemplation grew upon him in later life.

It was hardly to be expected that at the age of sixty-five Goethe should strike out new lines of poetical activity. However, in the *West-östliche Divan*, he made the first attempt to transplant Eastern poetry to a German soil, and set an example which has been followed by Heine and Mirza Schaffy. In 1811 he first became acquainted with the works of Hafiz in Hammer's translation. At a time when North and South and West were splitting in sunder, when thrones were breaking up and empires trembling, he sought a willing refuge in the restoring fountain of the Eastern poet. The book *Timur* has an obvious reference to the expedition of Napoleon in Russia, but the large majority of the poems are amatory, and are addressed to an imaginary Suleika, whose name is given to one of the books. Once more in his old age Goethe came under the sovereignty of a woman. She was Marianne von Willemer, the newly married wife of a Frankfort banker, Jacob von Willemer, who was an old friend of Goethe's and of his brother-in-law Schlosser. Goethe made her acquaintance in a journey which he took in the Rhine country with Sulpiz Boiserée, who had succeeded in interesting Goethe in early German art, a subject to which he was himself devoted. The correspondence between Goethe and Marianne was published in 1877. It extends almost to the day of his death, and includes letters from Eckermann giving an account of his last moments. Not only were most of the *Divan* poems addressed to Suleika, but several of those included in the collection are by Marianne herself, and will bear comparison with those of Goethe. In these poems the Oriental form is not very strictly observed. The fondness of the Orientals for the repetition of single rhymes is not attended to, and if sometimes remembered is soon forgotten. Their Eastern color depends rather on the suggestion of Eastern scenery and the introduction of Eastern names. This, however, gives the poet a greater license to levity, to fatalism, and to passion than would have been possible in poems of a purely German character.

The last twelve years of Goethe's life, when he had passed his seventieth birthday, were occupied by his criticisms on the literature of foreign countries, by the

*Wanderjahre*, and the second part of *Faust*. He was the literary dictator of Germany and Europe. He took but little interest in the direction in which the younger German school was moving, and was driven to turn his eyes abroad. He conceived an intense admiration for Byron, which was increased by his early death. Byron appears as Euphorion in the second part of *Faust*. He also recognized the greatness of Scott, and was one of the first to send a greeting to the Italian Mazzini. He conceived the idea of a world-literature transcending the narrow limits of race and country, which should unite all nations in harmony of feeling and aspiration. German writers claim that his design has been realized, and the literature of every age and country can be studied in a tongue which Goethe had made rich, flexible, and serviceable for the purpose. The *Wanderjahre*, although it contains some of Goethe's most beautiful conceptions, The Flight into Egypt, The Description of the Pedagogic Province, The Parable of the Three Reverences, is yet an ill-assorted collection of all kinds of writings, old and new.

With the completion of *Faust*, Goethe felt that the work of his life was accomplished. He still continued to work with regularity. He ordered and arranged his writings; he labored at his *Tages-und Jahresheften*, an autobiographical journal of his life. He bated not one jot of heart or hope, and took the liveliest interest in every movement of literature and science. When the news of the July Revolution of 1830 reached Weimar, Goethe was excited beyond his wont, not on account of the triumph of liberal principles, but because the controversy between Cuvier and Geoffrey St. Hilaire had been decided in favor of the latter. Still he had much to darken his latter days. His old friends were falling fast around him. His wife had died in 1816, after a union of thirty years. He felt her loss bitterly. The duchess Amalia had died eight years before, not long after the death of his own mother. He now had to undergo bitter experiences when he was less able to bear them. In June, 1828, he lost the companion of his youth, the grand-duke Karl August, who died suddenly, away from Weimar, on his return from a journey. Goethe received the news with outward calmness, but said, forebodingly, "Now it is all over," and went to mourn and labor at the castle of Dornburg, where everything reminded him of the days of their early friendship. The duchess Louise survived her husband till February, 1830. When Goethe died, in 1832, none of the old Weimar set were left except Knebel, who lived two years longer. A greater blow than these was the death of his only son, whom, in spite of his moral weakness, his father deeply loved. He died at Rome, in October, 1830, and is buried close by the pyramid of Caius Cestius, where Goethe himself once desired to be laid.

We must pass on to the closing scene. On Thursday, March 15, 1832, he spent his last cheerful and happy day. He was visited by the grand-duchess and other friends. He awoke the next morning with a chill. From this he gradually recovered, and on Monday was so much better that he designed to begin his regular work on the next day. But in the middle of the night he woke up with a deathly coldness, which extended from his hands over his body, and which it took many hours to subdue. It then appeared that the lungs were attacked, and that there was no hope of his recovery. Goethe did not anticipate death. He sat fully clothed in his arm-chair, made attempts to reach his study, spoke confidently of his recovery, and of the walks he would take in the fine April days. His daughter-in-law Ottilie tended him faithfully. On the morning of the 22d his strength gradually left him. He sat slumbering in his



arm-chair holding Ottilie's hand. Her name was constantly on his lips. His mind occasionally wandered, at one time to his beloved Schiller, at another to a fair female head with black curls, some passion of his youth. His last words were an order to his servant to open the second shutter to let in more light. After this he traced with his forefinger letters in the air. At half-past eleven in the day he drew himself, without any sign of pain, into the left corner of his arm-chair, and went so peacefully to sleep that it was long before the watchers knew that his spirit was really gone. He is buried in the grand-ducal vault, where the bones of Schiller are also laid.

GOETZ, HERMANN, a musical composer, presents one of those instances, too frequent in the history of art, of success long sought for, and cut short by death when achieved at last. He was born at Königsburg in Prussia in 1840, and began his regular musical studies at the comparatively advanced age of seventeen. He entered the music-school of Professor Stern at Berlin, and studied composition chiefly under Ulrich and Hans von Bülow. In 1863 he was appointed organist at Winterthur in Switzerland, where he lived in obscurity for a number of years, occupying himself with composition during his leisure hours. One of his works was an opera, *The Taming of the Shrew*, the libretto skillfully adapted from Shakespeare's play. After much delay it was produced at Mannheim (October, 1874), and its success was as instantaneous as it has up to the present proved lasting. It rapidly made the round of the great German theaters, and spread its composer's fame over all the land. But Goetz did not live to enjoy this happy result for long. In December, 1876, he died at Zurich from overwork.

GOG occurs in two passages of Scripture (Ezek. xxxviii.-xxxix., and Rev. xx) as the name of a great anti-theocratic power destined to manifest itself in the world immediately before the final dispensation is ushered in. In the later passage, Gog and Magog are spoken of as co-ordinate; in the earlier, Gog is given as the name of the person or people, and Magog as that of the land of its origin. Notwithstanding this discrepancy, it is obvious that the passages are intimately related, and that both depend upon Gen. x. 2, where, however, Magog alone is mentioned. Here he is the second son of Japhet, and, on the assumption that a geographical order underlies these ethnographical tables, his locality is to be sought between Gomer and Madai or Media. According to Josephus, who is followed by Jerome, the Scythians were primarily intended by this designation; and this opinion has been almost universally accepted in modern times. The name Scythians, it is to be observed, however, is often but a vague word for any or all of the numerous and but partially known tribes of the north; and any attempt to assign a more definite locality to Magog can only be very hesitatingly made. According to some, the Maiotes about the Palus Mæotis are meant; according to others, the Massagetæ; according to Kiepert, the inhabitants of the northern and eastern parts of Armenia. In Ezekiel, Gog is regarded as a terrible ruler in the extreme north, being prince of Rosh, Mesech, and Tubal, as well as governor in the land of Magog, and having the support of Persia, Ethiopia, and Phut, as well as of Gomer and the house of Togarmah. It may be considered as certain that the imagery employed in this prophetic description was suggested by the Scythian invasion which about the time of Isaiah had devastated Asia.

GOGO, or GHOGHÁ, a town in Ahmadábád district, Bombay, 193 miles northwest of Bombay. About three-quarters of a mile east of the town is an excellent anchorage, in some measure sheltered by the island of Perim, which lies still further east. The natives of this

are reckoned the best sailors in India; and ships touching here may procure water and supplies, or repair damages.

GOGOL, NIKOLAI VASILIEVICH, was born in the province of Poltava, in South Russia, March 31, 1809. Educated at the Niejin gymnasium, he there started a manuscript periodical, *The Star*, and wrote several pieces, including a tragedy, *The Brigands*. In 1829, he published anonymously a poem called *Italy*, and, under the pseudonym of V. Alop, an idyll, *Hans Kuchel Garten*, which he had written while still at Niejin. In 1830 he published in a periodical the first of the stories which appeared next year under the title of *Evenings in a Farm near Dikanka: by Rudy Panko*. Between 1830 and 1835 he published his *Arabesques*, a collection of essays and stories; his *Taras Balba*, the chief of the *Cossack Tales* translated into English by George Tolstoy; and a number of novelettes. To the same period belongs his celebrated comedy, the *Revizor*, or Government Inspector. His aim in writing it was to drag into light "all that was bad in Russia," and to hold it up to contempt. And he succeeded in rendering contemptible and ludicrous the official life of Russia, the corruption universally prevailing throughout the civil service, the alternate arrogance and servility of men in office. The play appeared on the stage in the spring of 1836, and achieved a full success, in spite of the opposition attempted by the official classes whose malpractices it exposed. The aim which Gogol had in view when writing the *Revizor* he afterward fully attained in his great novel, *Dead Souls*, the first part of which appeared in 1842. The last works which he published, his *Confession* and *Correspondence with Friends*, offer a painful contrast to the light, bright, vigorous, realistic, humorous writings which had gained and have retained for him his immense popularity in his native land. Asceticism and mystical exaltation had told upon his nervous system, and its feeble condition showed itself in his literary compositions. In 1848 he made a pilgrimage to Jerusalem, and on his return settled down at Moscow, where he died, March 3, 1852, not having quite completed his forty-third year.

GOITER, a term in medicine applied to a swelling in the front of the neck caused by an enlargement of the thyroid gland.

In districts where the disease prevails the goiter usually appears in early life, often from the eighth to the twelfth year. Its growth is at first slow, but after several years of comparative quiescence a somewhat sudden increase is a not unfrequent occurrence. In the earlier stages of the disease the condition of the gland is simply an enlargement of its constituent parts, which retain their normal soft consistence; but in the course of time other changes supervene, and it may become the seat of cystic formations, or acquire hardness from increase of connective tissue or calcareous deposits. Occasionally the enlargement of the gland is uniform, but more commonly one of the lobes, generally the right, is the larger. In some rare instances the disease has been noticed to be limited almost entirely to the isthmus which connects the two lobes of the gland. The growth is unattended with pain, and is not inconsistent with a fair measure of health.

Goiter is a marked example of an endemic disease. There are few parts of the world where it is not found prevailing in certain localities, these being for the most part valleys and elevated plains in mountainous districts. It is noteworthy that goiter can often be cured by removal from the district where it prevails, as also that it is apt to be acquired by previously healthy persons who settle in goiterous localities; and it is only in such places that the disease exhibits any hereditary tendencies.



In the treatment of goiter the first step is the removal, if possible, of the patient from the affected locality, and attention to general hygienic rules. Small and gradual increased doses of iodine, either in the form of iodide of potassium or what is known as Lugol's solution appear to be the best methods of administration. The external application of iodine to the goiter, in the form of liniment or ointment, is of scarcely less value than its internal employment, and would seem to be sometimes capable of effecting a cure alone, as is evident from the method of treatment adopted with singular success in India. This consists in applying to the goiter, by means of a spatula, an ointment of biniodide of mercury for about ten minutes soon after sunrise, and placing the patient with his goiter exposed to rays of the sun for six or seven hours. Blistering of the surface generally follows, a second application of the ointment is made, and the patient sent home. This is often found sufficient to effect the cure.

The name "Exophthalmic Goiter," is applied to another form of enlargement of the thyroid gland, differing entirely in its pathological connections from that above described. In this affection the bronchocele is but one of three phenomena, which together constitute the typical characteristics of the disease, viz., palpitation of the heart and great vessels, enlargement of the thyroid gland, and protrusion of the eyeballs. Although occasionally observed in men, this affection occurs much more commonly in females and in comparatively early life. It is generally preceded by ill health in some form, more particularly impoverishment of blood, and nervous or hysterical disorders, and is occasionally seen in cases of organic heart disease. It has sometimes been suddenly developed as the effect of fright or violent mental emotion. The first of the symptoms to appear is usually the palpitation of the heart, which is aggravated by the slightest exertion, and may be so severe as not only to shake the whole frame but even to be audible at some distance from the patient. An uncomfortable sensation of throbbing is felt throughout the body, and many of the larger blood-vessels are seen to pulsate strongly like the heart. The enlargement of the thyroid gland generally comes on gradually, and rarely increases to any great size, thus differing from true goiter, as originally noticed by Doctor Graves. The enlarged gland is of soft consistence, and communicates a thrill to touch from its dilated and pulsating blood-vessels.

Accompanying the goiter a remarkable change is observed in the appearance of the eyes, which attract attention by their prominence and the startled expression thus given to the countenance. In extreme cases the eyes protrude from their sockets to such a degree that the eyelids cannot be closed, and injury may thus arise to the constantly exposed eyeballs. Apart from such risk, however, the vision is rarely affected in this disease.

In the treatment of exophthalmic goiter the most successful results have been attained by the use of digitalis, which has the effect of giving tone to the heart and contracting the dilated blood-vessels. The tincture of digitalis, in doses of five to ten drops twice or thrice daily, is perhaps the best form of administration. Where anæmia is present iron is indicated, and may be combined with the digitalis, although in some cases it is found to be unsuitable. In allaying the palpitation benefit is said to have frequently followed the application of ice to the cardiac region as well as to the thyroid gland. Iodine, which is so valuable in cases of true goiter, is generally admitted to be of no service in this disease, and is rather held to be injurious.

GOITO, a large village of Italy, in the province of Mantua and district of Volta, situated on the right bank

of the Mincio, about fourteen miles from Castiglione, on the highway between Brescia and Mantua.

GOLCONDA, a fortress and ruined city, situated in the Nizám's Dominions, seven miles west of Hyderabad city. In former times Golconda was a large and powerful kingdom of the Deccan, which arose on the downfall of the Báhmāni dynasty, but was subdued by Aurungzebe in 1687, and annexed to the dominions of the Delhi empire. The diamonds of Golconda have obtained great celebrity throughout the world; but they were merely cut and polished here, being generally found at Partial, near the southeastern frontier of the nizám's territory.

GOLD. The color, luster and power of resisting oxidation, which this metal possesses, have caused it to be valued from the earliest ages. Allusions to gold are frequent in the Old Testament, and the refining of the precious metals by cupellation seems to have been a favorite illustration with the Jewish poets. Jewelry and vessels found in the Egyptian tombs afford evidence of the perfection attained in working gold at a period earlier than the government of Joseph, and drawings on tombs of about this epoch clearly indicate the method of conducting the operations of washing, fusing and weighing the metal. Excavations in Etruria have brought to light beautiful ornaments of gold, enriched with minute grains of the metal, the workmanship of which was unrivaled until Castellani studied and revived the methods employed by Etruscan artists. The Greeks were familiar with natural alloys of silver and gold named *electrum*, rough nuggets of which were frequently stamped, and formed the earliest coins in Lydia. The color of this electrum is pale yellow to yellowish white, and it contains from 20 to 40 per cent. of silver.

With regard to the history of the metallurgy of gold, it may be mentioned that, according to Pliny, mercury was employed in his time both as a means of separating the precious metals and for the purposes of gilding. Vitruvius also gives a detailed account of the means of recovering gold, by amalgamation, from cloth into which it had been woven.

Gold is the only metal of a yellow color, which is, however, notably affected by small quantities of other metals; thus the tint is sensibly lowered by small quantities of silver and heightened by copper. The surface color of particles of gold is often apparently reddened by translucent films of brown iron ore. It is nearly as soft as lead. The *hardness* varies, however, with the composition. Crystallized specimens from Oregon and Fraser river, containing respectively 835 and 910 parts of gold in 1,000, are slightly harder than calc spar, but sensibly softer than fluor spar, or much harder than the pure metal. When pure, gold is the most *malleable* of all metals. One grain may be beaten into leaves which cover a surface of fifty-six square inches, and are only  $\frac{28}{1000}$  of an inch thick. Faraday has shown that the thickness of gold leaves may be still further reduced by floating them on a dilute solution of cyanide of potassium. When very thin, leaf gold appears yellow by reflected and green by transmitted light. If, however, certain gold films are heated, the light transmitted is ruby red; the pressure of a hard substance on the film so changes its state of aggregation that green light is again transmitted. The metal is extremely *ductile*; a single grain may be drawn into a wire 500 feet in length, and an ounce of gold covering a silver wire is capable of being extended more than 1,300 miles. Gold can readily be welded cold, and thus the finely divided metal, in the state in which it is precipitated from solution, may be compressed between dies into discs or medals. The specific gravity of cast gold varies from 18.29 to 19.37, and by compression between dies



# GOLD-MINING.

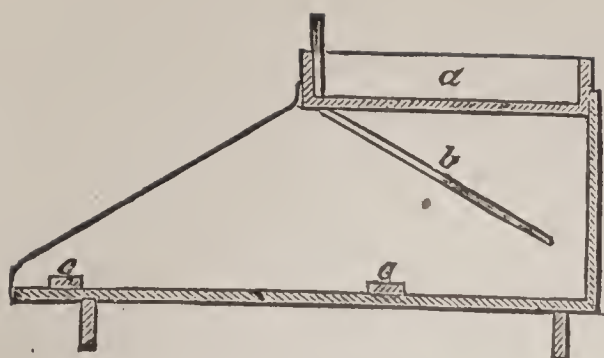


FIG. 1.—Cradle.

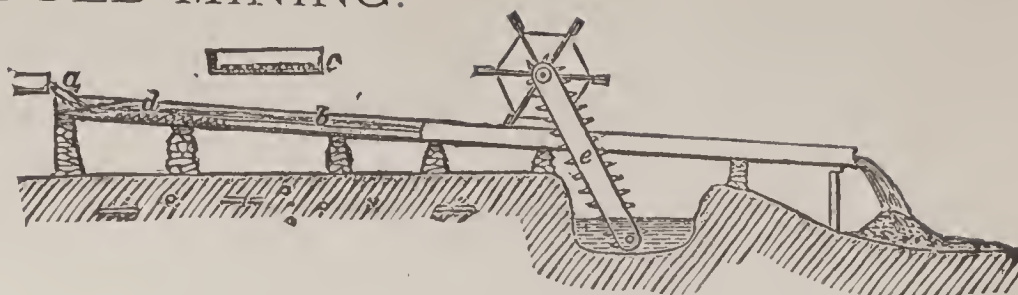


FIG. 2.—Sluice.



FIG. 3.—Hydraulic Gold Working.

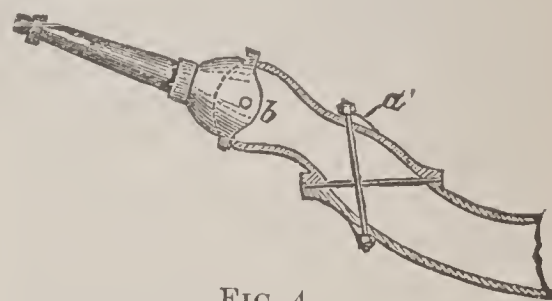


FIG. 4.

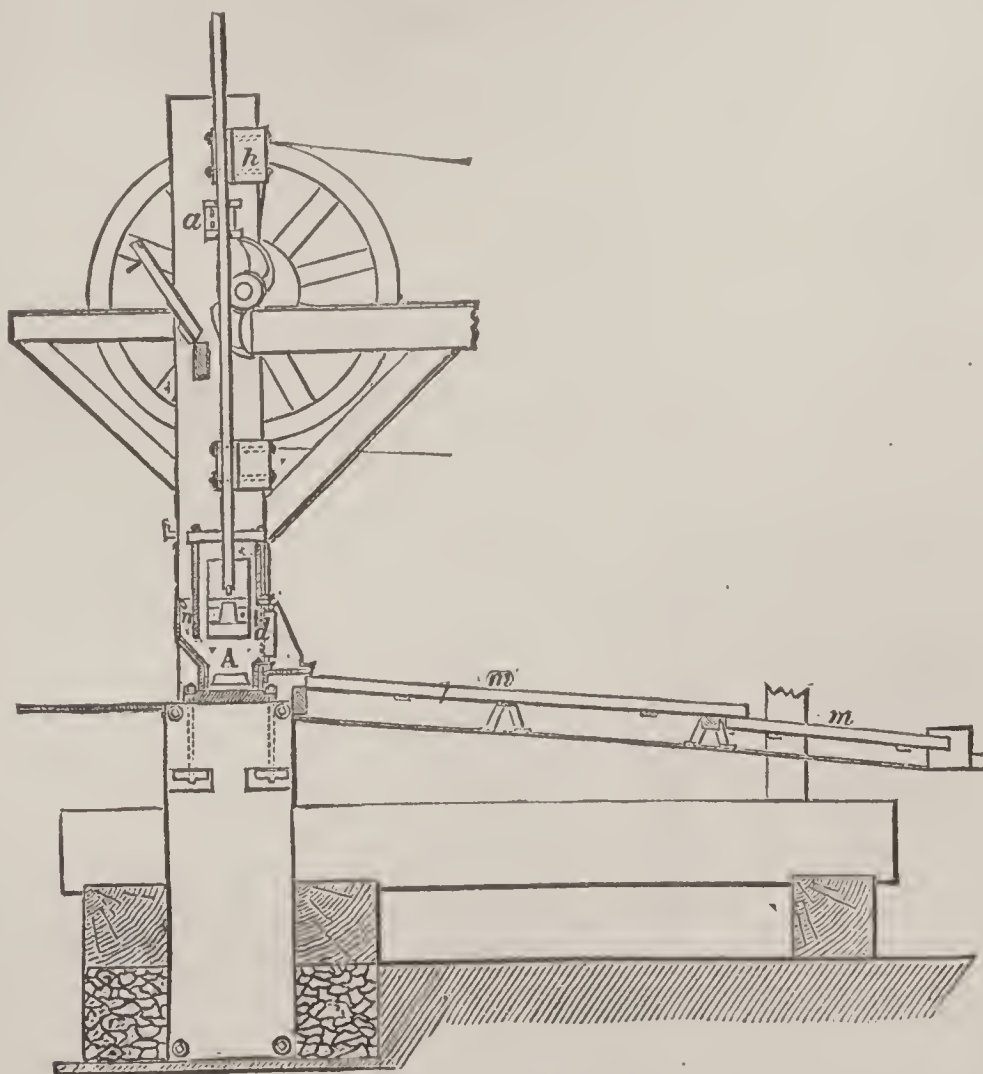


FIG. 5.—Stamp Mill.



# GOLD-MINING.

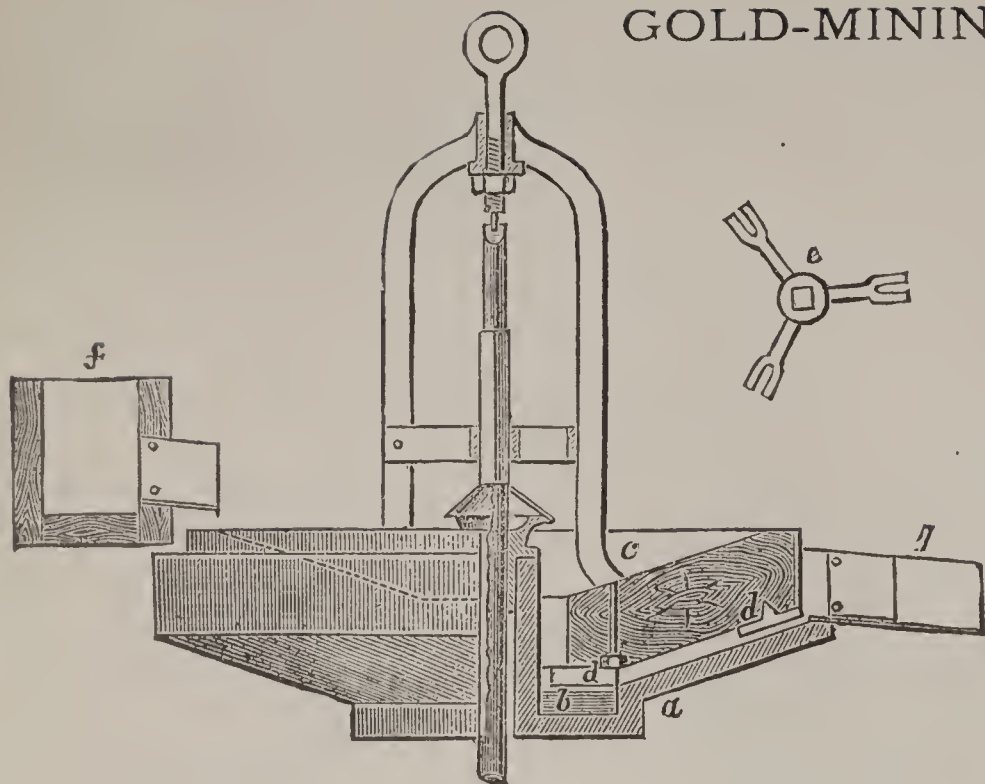


FIG. 6.—Hungarian Mill.

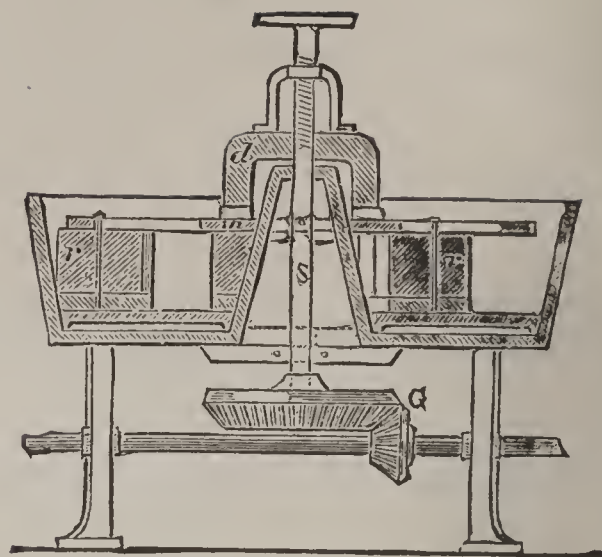


FIG. 7.—Knox Pan.

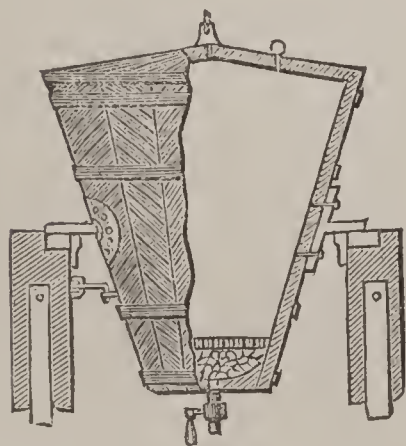


FIG. 8.

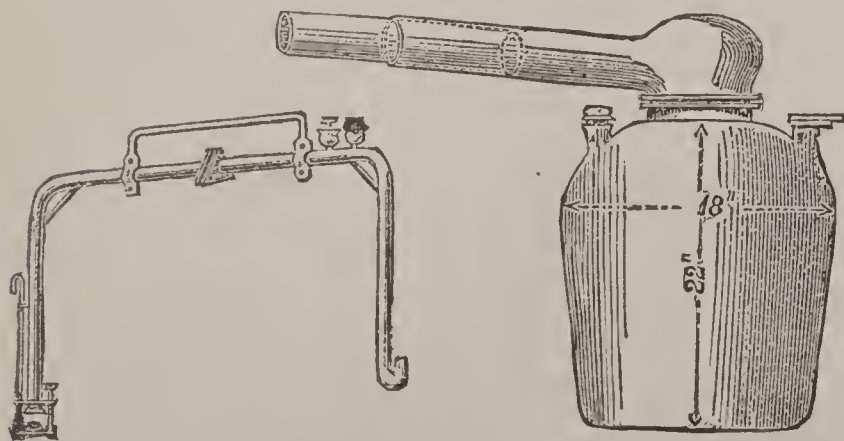


FIG. 9.—Refinery Siphon and Alembic.

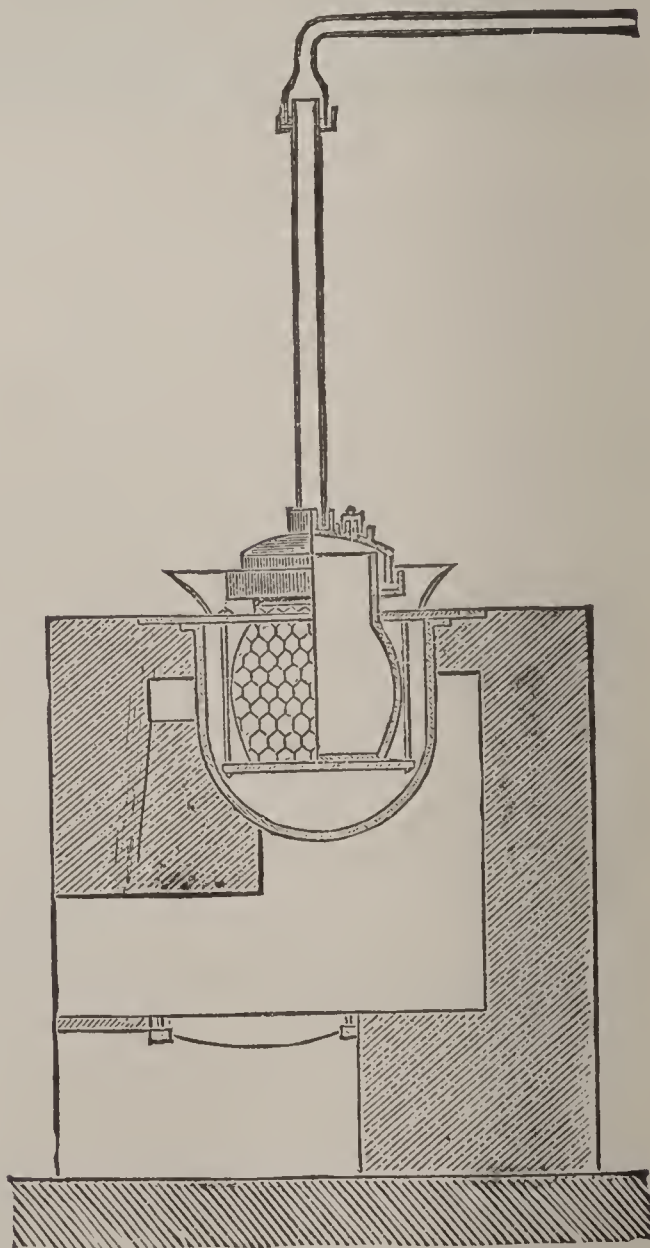


FIG. 10.



the specific gravity may be raised from 19.37 to 19.41; by annealing, however, the previous density is, to some extent, recovered, as it then is found to be 19.40. Different observers have given the following temperatures as its *melting point*:—1425° C. (Daniell), 1200° C. (Pouillet), 1380° C. (Guyton de Morveau). Reimsdijk, after comparing the several results, concludes that it may be considered to be 1240° C.

Finely divided gold dissolves when heated with strong sulphuric acid and a little nitric acid. Dilution with water, however, precipitates the metal as a violet or brown powder from the solution so obtained. Gold is also attacked when strong sulphuric acid is submitted to electrolysis with a gold positive pole.

Gold is found in nature chiefly in the metallic state, or as native gold, and less frequently in combination with tellurium, lead and silver, forming a peculiar group of minerals confined to a few localities in Europe and America. These are the only certain examples of natural combinations of the metal—the minute although economically valuable quantity often found in pyrites and other sulphides being probably only present in mechanical suspension, although for practical purposes it may be spoken of as combined. The native metal occurs tolerably frequently in crystals belonging to the cubic system, the octahedron being the commonest form, but other and complex combinations have been observed. Owing to the softness of the metal, large crystals are rarely well defined, the points being commonly rounded. In the irregular crystalline aggregates branching and moss-like forms are most common, and in Transylvania thin plates or sheets with diagonal structures are characteristic.

Of the minerals containing gold the most important are sylvanite or graphic tellurium, of composition  $(\text{AgAu})\text{Te}_2$ , with 24 to 26 per cent.; calaverite,  $\text{AuTe}_2$ , with 42 per cent.; and nagyagite or foliate tellurium, of a complex and rather indefinite composition, with 5 to 9 per cent. of gold. These are confined to a few localities, the oldest and best known being those of Nagyag and Ofenbanya in Transylvania; but latterly they have been found in some quantity at Red Cloud, Colorado, and in Calaveras county, California—the nearly pure telluride of gold, calaverite, being confined to these places.

The distribution of gold-bearing deposits is world-wide; although the relative importance of different localities is very different; their geological range is also very extensive. In Europe the principal groups of veins are in slaty or crystalline schists, whose age, when it can be determined, is usually Palæozoic, Silurian, Devonian, or Carboniferous, and less commonly in volcanic formations of Tertiary age. The alluvial deposits, being more extensive, are less intimately connected with any particular series of rocks. Few of either are, however, of much importance as compared with the more productive deposits of America and Australia.

On the continent of Europe, the great rivers originating in the crystalline rocks of the Alpine region, such as the Rhine and Danube, are slightly auriferous in their alluvial deposits in several places; but the proportion of gold is extraordinarily minute, so that the working is only carried on by gipsies, or by the local peasantry at irregular intervals, the return for the labor expended being very small. The same remark applies to the Rhone and its affluents, and the rivers of the central granitic mass of France. In the Austrian Alps the gold quartz mines at the Rathausberg, near Gastein, at a height of about 9,000 feet above the sea-level, and at Zell, in Tyrol, are of interest historically, as having developed the system of amalgamation in mills, although they are economically of small importance at present. On the

Italian side, in the Valanzasca and Val Toppa, above Lago Maggiore, a group known as the Pestarena mines have yielded from 2,000 to 3,000 ounces annually for several years past; and more recently a discovery of great interest of a highly auriferous copper ore has been made at Ollomont in the Val d'Aosta. In Hungary, the gold-bearing veins of Schemnitz occur in greenstones and trachytes of Tertiary age, the most powerful example, the *Spitaler-gang*, being filled with a mixture of quartz and brown iron ore, known as zinnopal, and containing gold associated with silver ores, galena, and pyrites. In Transylvania, at Nagyag, the gold-bearing tellurium minerals previously noticed are found in small veins traversing greenstone trachyte. These are often very thin, as low as  $\frac{1}{8}$ th to  $\frac{1}{16}$ th of an inch, but each is carefully traced out, the rock being impregnated with gold and silver to a certain depth on each side. At Vörospatak, another Transylvanian locality, gold, with a very large proportion of silver, and associated with gypsum, is worked in veins traversing a Tertiary sandstone, being almost the only known instance of such a mode of occurrence.

The Russian empire has the largest gold production among the countries of the Old World, most of the produce, however, being derived from its Asiatic territories.

The gold deposits of the Caucasus, though immortalized in the tradition of Jason and the Argonauts, are now entirely abandoned, the last attempt at working them having been suspended in 1875.

On the Atlantic slopes of North America the chief gold-bearing localities are on the Chaudière river, near Quebec, and in Nova Scotia. In both instances the quartz veins worked are contained in slates belonging to the Quebec group of the Lower Silurian period, those of the latter province being specially remarkable for their quasi-stratified character, as they penetrate the slates at a very low angle of inclination, and have been folded and corrugated together with the containing rocks by subsequent disturbances. Other deposits of old geological periods are found in Tennessee and North Carolina.

On the Pacific side of America gold is found under very different conditions, and on a much larger scale than on the Atlantic side. The whole distance from Mexico to Alaska may be said to be more or less auriferous, the most extensive deposits being in the great north-and-south valley of the Sacramento, which runs parallel to the coast, between the so-called Coast Mountains and the Sierra Nevada, the latter being distinguished farther to the north in the Cascade range. Others of less extent are known in the Klamath, Columbia, and Fraser river basins; they extend in the last two far back into the interior, to the region between the Cascade range and the Rocky Mountains. In many of these valleys alluvial deposits are developed to an extent unparalleled elsewhere, the river channels being bordered by banks or benches of gravel and sand, rising in terraces to considerable heights on the flanks of the hills. For example, at the Methow, a tributary of the Columbia, there are sixteen lines of such terraces, the highest about 1,200 feet above the river; and at Colville, on the Columbia, traces of old terraces, much degraded by frost and rain, are seen at 1,500 feet above the river. These gravels, which are of Pliocene and more recent origin, are in many places, though very unequally, auriferous, the richest points being found in the bars or shingle banks of the river after the summer floods, and in the channels of the smaller tributary streams, where the poorer material has been partially enriched by a process of natural washing. The most extensive, or rather the best known because most completely explored, deposits



of this class are those of the Upper Sacramento valley, in California. Others of considerable importance are worked in the Cariboo district on the Upper Fraser river, yielding very coarse gold. Another discovery of a singular character, the produce being a regular gold gravel, was made some years back at Salmon river in Oregon, but the deposit, though exceedingly rich, was soon exhausted. Gold-bearing quartz veins are also common over a large part of California, notably in Grass Valley, in strata that are supposed to be of Triassic age, the associated minerals being iron and arsenical pyrites, galena, etc. In Calaveras county, tellurium ores like that of Transylvania are characteristic of the gold veins. In the adjacent States of Nevada and Colorado, gold is so intimately associated with silver ores that it is for the most part only obtained from the ultimate process of refining the reduced silver. The same remark applies to the most of the mines of Mexico, and on the southwest coast of America, in Peru, Bolivia, and Chili. (See SILVER.)

Very rich gold quartz has been brought from Carabaya, on Lake Titicaca; and considerable deposits, both alluvial and in veins, have been opened at Caratal, in Venezuela, and at St. Elie, in French Guiana, which are interesting as proving the actual existence of Raleigh's Eldorado.

In Brazil the principal gold mines are upon veins in clay slate, and a peculiar class of rocks known as Jacotinga, or Itabirite, and which are mixtures of quartz, chlorite, and specular iron ore, the latter often occurring in large mirror-like crystals several inches across. The gold occurs almost entirely in pyritic minerals, being most abundant in ordinary iron pyrites, and less so in magnetic and arsenical pyrites, free gold being rarely seen.

The gold product of the United States far exceeds that of any other country. We give a tabulated statement of the total production of each State since 1793 to 1887, inclusive, and also the production of each State for the latter year. From the annual report of the director of the mint, December, 1888:

| LOCALITY.                           | Gold.              |
|-------------------------------------|--------------------|
| Alabama.....                        | \$230,442 40       |
| Alaska.....                         | 533,918 35         |
| Arizona.....                        | 4,491,815 99       |
| California.....                     | 748,741,859 72     |
| Colorado.....                       | 54,207,640 80      |
| Dakota.....                         | 30,803,577 68      |
| Georgia.....                        | 8,634,296 52       |
| Idaho.....                          | 30,070,655 21      |
| Indiana.....                        | 40 13              |
| Maine.....                          | 5,638 20           |
| Maryland.....                       | 5,047 42           |
| Massachusetts.....                  | .....              |
| Michigan.....                       | 79,513 26          |
| Montana.....                        | 62,576,431 21      |
| Nebraska.....                       | 2,078 76           |
| Nevada.....                         | 25,207,940 96      |
| New Hampshire.....                  | 11,020 55          |
| New Mexico.....                     | 3,192,699 07       |
| North Carolina.....                 | 11,383,746 55      |
| Oregon.....                         | 19,626,732 84      |
| Pennsylvania.....                   | 1,138 34           |
| South Carolina.....                 | 1,685,711 71       |
| Tennessee.....                      | 88,823 64          |
| Texas.....                          | 2,147 40           |
| Utah.....                           | 954,131 36         |
| Vermont.....                        | 85,598 21          |
| Virginia.....                       | 1,733,580 28       |
| Washington Territory.....           | 492,384 05         |
| Wyoming.....                        | 770,247 33         |
| Other sources, or not reported..... | 38,210,823 11      |
| Total unrefined.....                | \$1,043,829,681 05 |
| Refined bullion.....                | 323,185,776 39     |
| Grand total.....                    | \$1,367,015,457 44 |

Gold production of the United States during the calendar year 1887:

| STATE OR TERRITORY.                                              | Gold.        |
|------------------------------------------------------------------|--------------|
| Alaska.....                                                      | \$ 675,000   |
| Arizona.....                                                     | 830,000      |
| California.....                                                  | 13,400,000   |
| Colorado.....                                                    | 4,000,000    |
| Dakota.....                                                      | 2,400,000    |
| Georgia.....                                                     | 110,000      |
| Idaho.....                                                       | 1,900,000    |
| Michigan.....                                                    | 26,000       |
| Montana.....                                                     | 5,230,000    |
| Nevada.....                                                      | 2,500,000    |
| New Mexico.....                                                  | 500,000      |
| North Carolina.....                                              | 225,000      |
| Oregon.....                                                      | 900,000      |
| South Carolina.....                                              | 50,000       |
| Utah.....                                                        | 220,000      |
| Washington Territory.....                                        | 150,000      |
| Texas.....                                                       | .....        |
| Alabama, Tennessee, Virginia, Vermont, Michigan and Wyoming..... | 20,000       |
| Total (mint director's estimate).....                            | \$33,136,000 |

In India gold is obtained in small quantities by native gold washers in various parts of the highlands of southern Bengal, and more recently quartz veins and alluvial deposits of considerable promise have been discovered in the district of Wynaad, in the southern part of the Madras presidency.

In Africa the chief gold-bearing localities are on the west coast—gold dust derived from alluvial washings, forming an article of export from many of the trading stations along the Guinea coast.

The gold districts of Australia cover a very considerable area, extending from the east side of the continent for about 20° of latitude, the more important deposits being those of Victoria, in the south. The principal districts are in Victoria—Ballarat, Castlemaine and Sandhurst, lying west and north from Melbourne and Beechworth, near the Murray river to the northeast.

*Proportion of Gold in Deposits.*—A rich gold-bearing deposit is quantitatively very different from one to which the same term is applied when containing ores of other metals. In the latter the useful material must as a rule form a considerable proportion—one or more parts in a hundred—of the mass; while in the former, owing to the superior value of the product, it rarely attains as much as 1 per cent., and is generally very much less, the amount of gold contained in easily worked alluvial deposits being often extremely small.

In vein mining, which is more difficult and costly, a larger yield is necessary, but probably five dwts., or about £1 in value per ton, will in most places represent paying quantities from quartz containing free gold, *i.e.*, not associated with pyrites.

In the less tractable minerals, such as arsenical pyrites occurring in the lower portions of the veins, as much as one and a half to three ounces may be required for profitable working. When associated with the ores of other metals, such as silver, lead and copper, the extraction of the gold is in most cases an incidental and final operation in their metallurgical treatment, and may therefore be best considered in the articles on these metals.

The various deposits of gold may be divided into two classes—"veins" and "placers." The vein mining of gold does not greatly differ from that of similar deposits of metal. It will only be necessary to refer here to certain details of the extraction of gold in such cases. In the placer or alluvial deposits, the precious metal is



found usually in a water-worn condition imbedded in earthy matter, and the method of working all such deposits is based on the disintegration of the earthy matter by the action of a stream of water, which washes away the lighter portions and leaves the denser gold. In alluvial deposits the richest ground is usually found in contact with the "bed rock;" and, when the overlying cover of gravel is very thick, or, as sometimes happens, when the older gravel is covered with a flow of basalt, regular mining by shafts and levels, as in what are known as tunnel-claims, may be required to reach the auriferous ground. In the early days of gold washing in California and Australia, when rich alluvial deposits were common at the surface, the most simple appliances sufficed; the most characteristic being the "pan," a circular dish of sheet iron with sloping sides about thirteen or fourteen inches in diameter. The pan, about two-thirds filled with the "pay dirt" to be washed, is held in the stream or in a hole filled with water. The miner, after separating the larger stones by hand, imparts a gyratory motion to the pan by a combination of shaking and twisting movements which it is impossible to describe exactly, so as to keep its contents suspended in the stream of water, which carries away the bulk of the lighter material, leaving a black residue consisting of magnetic iron ore and other heavy minerals, together with any gold which may originally have been present in the mass. The washing is repeated until enough of the enriched sand is collected, when the gold is finally recovered by careful washing or "panning out" in a smaller pan. In Mexico and South America, instead of the pan, a wooden dish or trough, variously shaped in different districts, and known as "batea," is used.

The "cradle," a simple appliance for treating somewhat larger quantities, varies in length from three feet six inches to seven feet, but the shorter length is that usually adopted. Its nature will be evident from fig. 1, in which *a* is a movable hopper with a perforated bottom of sheet iron in which the "pay dirt" is placed. Water is poured on the dirt, and the rocking motion imparted to the cradle causes the finer particles to pass through the holes in the hopper on to the screen *b*, which is of canvas, and thence to the base of the cradle, where the auriferous particles accumulate on the transverse bars of wood, *c*, called "riffles." Washing by the cradle, which is now but little used except in preliminary workings, is tedious and expensive.

The "tom" is a sort of cradle with an extended sluice placed on an incline of about one foot in twelve. The upper end contains a perforated riddle plate which is placed directly over the riffle box, and under certain circumstances mercury may be placed behind the riffles. Copper plates amalgamated with mercury are also used when the gold is very fine, and even in some instances amalgamated silver coins have been used for the same purpose. Sometimes the stuff is disintegrated with water in a "puddling machine," which is used, especially in Australia, when the earthy matters are tenacious and water scarce. The machine frequently resembles a brickmaker's wash-mill, and is worked by horse or steam power.

In workings on a larger scale, where the supply of water is abundant, as in California, sluices are generally employed. They are shallow troughs about twelve feet long, about sixteen to twenty inches wide and one foot in depth. The troughs taper slightly so that they can be joined in series, the total length often reaching several hundred feet. The incline of the sluice varies with the conformation of the ground and the tenacity of the stuff to be washed, from one in sixteen to one in eight.

Fig. 2 represents one of the simplest forms of sluice

as used in river diggings in the northwest of America. A rectangular trough of boards, whose dimensions depend chiefly on the size of the planks available, is set up on the higher part of the ground at one side of the claim to be worked, upon trestles or piers of rough stone-work, at such an inclination that the stream may carry off all but the largest stones, which are kept back by a grating of boards about two inches apart at *a*. The gravel, which in this particular instance is from twelve to sixteen feet thick, and with an average breadth to the river of twenty-five to thirty feet, is dug by hand and thrown in at the upper end, the stones kept back being removed at intervals by two men with four-pronged steel forks. The floor of the sluice is laid with riffles made of strips of wood two inches square laid parallel to the direction of the current (as at *b*, and in cross section at *c*), and at other points, *d*, with boards having transverse notches filled with mercury. These were known originally as Hungarian riffles. The bottom of the working, which is below the drainage level of the valley, is kept dry by a Chinese bucket pump, *e*, attached to a rough undershot wheel driven by the current in the sluice. The sluice boxes are made in lengths, and united together spigot and faucet fashion, so that they may easily be removed and reerected as the different parts of the claim are progressively exhausted.

In the larger and more permanent erections used in hydraulic mining, the upper ends of the sluices are often cut in rock or lined with stone blocks, the grating stopping the larger stones being known as a "grizzly." In order to save very fine and especially rusty particles of gold, so-called "under-current sluices" are used; these are shallow wooden tanks, fifty square yards and upward in area, which are placed somewhat below the main sluice, and communicate with it above and below, the entry being protected by a grating so that only the finer material is admitted. These are paved with stone blocks or lined with mercury riffles, so that from the greatly reduced velocity of flow, due to the sudden increase of surface, the finer particles of gold may collect. In order to save finely divided gold, amalgamated copper plates are sometimes placed in a nearly level position, at a considerable distance from the head of the sluice, the gold which is retained in it being removed from time to time. Sluices are often made double, and they are usually cleaned up,—that is, the deposit rich in gold is removed from them,—once a week. The gold is then recovered by "panning."

The general appearance of an hydraulic gold working is seen in fig. 3, the water being brought from a ditch on the high grounds, and through a line of pipes to the distributing box, whence the branch pipes supplying the three jets diverge. The stream issues through a nozzle resembling that of a fire engine (fig. 4), which is movable in a horizontal plane around the vertical axis *a*, and in a vertical plane on the spherical joint and center *b*, so that the direction of the jet may be varied through considerable angles by simply moving a handle. The material of the bank, being loosened by the cutting action of the water, crumbles into holes, or "caves in," and the superincumbent mass, often with large trees and stones, falls into the lower ground. The stream, laden with stones and gravel, passes into the sluices, where the gold is recovered in the manner already described.

Under the most advantageous conditions the loss of gold may be estimated at 15 or 20 per cent., the amount recovered representing a value of about half a dollar per ton of gravel treated. The loss of mercury is about the same, from five to six cwt. being in constant use per mile of sluice. About one cwt. is added daily in at least two charges. The average half-yearly



consumption is estimated at about one hundred flasks of seventy-four pounds each, after allowing for the amount recovered in clearing up and distillation of the amalgam. The latter operation is performed at intervals of seven or fourteen days in the upper lengths of the sluice, and half-yearly in the lower parts.

The dressing or mechanical preparation of vein stuff containing gold is generally similar to that of other ores, except that the precious metal should be removed from the waste substances as quickly as possible, even although other minerals of value that are subsequently recovered may be present. This is usually done by amalgamation with mercury. In all cases the quartz or other vein stuff must be reduced to a very fine powder as a preliminary to further operations. This may be done in several ways, *e.g.*, either (1) by the Mexican crusher or *arrastra*, in which the grinding is effected upon a bed of stone, over which heavy blocks of stone attached to cross arms are dragged by the rotation of the arms about a central spindle, motion being furnished by mules or other power, or (2) by the Chilian mill or *trapiche*, also known as the edge-runner, where the grinding stones roll upon the floor, at the same time turning about a central upright—contrivances which are mainly used for the preparation of silver ores; but by far the largest proportion of the gold quartz of California and Australia is reduced by (3) the stamp mill, which is similar in principle to that used in Europe for the preparation of tin and other ores, but has received special modification in many details. Fig. 5 represents the ordinary California pattern of a stamp mill. The stamp is a cylindrical iron pestle faced with a chilled cast-iron shoe, removable so that it can be renewed when necessary, attached to a round iron rod or lifter, the whole weighing from 600 to 800 lbs. The lift is effected by cams acting on the under surface of tappets *a*, and formed by cylindrical boxes keyed on to the stems of the lifter about one-fourth of their length from the top. As, however, the cams, unlike those of European stamp mills, are placed to one side of the stamp, the latter is not only lifted but turned partly round on its own axis, whereby the shoes are worn down uniformly. The bed or mortar *A* is of cast-iron. The height of lift may be between eight and ten inches, and the number of blows from thirty to ninety per minute. The stuff, previously broken to about two inch lumps in a Blake's rock-breaker, is fed in through the aperture *n* at the back of the "battery box," a constant supply of water being given from the channel *k*, and mercury in a finely divided state is added at frequent intervals. The discharge of the comminuted material takes place through the aperture *d*, which is covered by a thin steel plate perforated with numerous slits about  $\frac{1}{50}$  inch broad and  $\frac{1}{10}$  to  $\frac{1}{8}$  inch long, a certain volume being discharged at every blow and carried forward by the flushing water over the apron or table in front, *m*, covered by copper plates filled with mercury. Similar plates are often used to catch any particles of gold that may be thrown back, while the main operation is so conducted that the bulk of the gold may be reduced to the state of amalgam by bringing the two metals into intimate contact under the stamp head, and remain in the battery. The tables in front are laid at an incline of about eight degrees, and are about thirteen feet long; they collect from 10 to 15 per cent. of the whole gold; a further quantity is recovered by leading the sands through a gutter about sixteen inches broad and one hundred and twenty feet long, also lined with amalgamated copper plates, after the pyritic and other heavy minerals have been separated by depositing in catch pits and other similar contrivances.

When the ore does not contain any considerable

amount of free gold, mercury is not, as a rule, used in the battery. The pulverized stuff is received upon blanket tables or sluices. These are inclined boards covered with coarse woollen cloth or sacking. The heavier particles become entangled in the fibers of the cloth, while the lighter deposits are carried forward by the current. At intervals of a quarter to half an hour the surface of the blanket is completely covered, when it is removed, and its contents are washed off in a tub of water and reserved for further treatment. This consists of amalgamation, in a contrivance analogous to the Hungarian mill subsequently described, and subsequent treatment in pan amalgamators somewhat similar to the *arrastra* in character, but with grinding surfaces of iron instead of stone.

At Schemnitz, in Hungary, quartz vein stuffing containing a little gold, partly free and partly associated with pyrites and galena, is, after stamping in mills similar to those described above, but without rotating stamps, passed through the so-called Hungarian gold mill, fig. 6. This consists of a cast-iron pan, *a*, having a shallow cylindrical bottom *b*, holding fifty pounds of mercury, in which a wooden runner *c*, nearly of the same shape as the inside of the pan, and armed below with several projecting blades, is made to revolve by gearing wheels either above, or, as in the figure, below. The connection of the runner with the driving shaft is effected by the three-armed crutch shown in plan at *e*, which sits on the square part of the shaft. By means of set screws analogous to those of a flour mill, the runner is adjusted at such a height that the knives just clear the surface of the mercury. The stuff from the stamps arrives by the gutter *f*, and, falling through the hole in the middle of the runner, is distributed over the mercury, when the gold subsides in virtue of its superiordensity, while the quartz and lighter materials are guided by the blades to the circumference, and are discharged at *g*, usually into a second similar mill, and sometimes to a third, placed at lower levels, and subsequently pass over blanket tables. The most advantageous speed is from twelve to fourteen inches per minute. The action of this so-called mill is really more nearly analogous to that of a centrifugal pump, as no grinding action takes place in it. The amalgam is cleaned out about once a month. The average amount of gold collected from fifty tons of stuff stamped is about six ounces in the mills, and in the subsequent dressing processes one pound of auriferous silver and ten hundred weight of lead. According to Rittinger, mercury that has been purified by distillation acts much more rapidly upon gold than such as has been saturated with the metal without losing its fluidity, although the amount that can be dissolved is very small.

There are various forms of pan amalgamators of which space will not permit a description to be given. It may be stated, however, that experience of the great variety of pans that have from time to time been devised has led to the adoption of the more simple forms, in which the grinding is effected between horizontal flat surfaces instead of curved or conical bottoms, and in the pans now usually employed these flat grinding surfaces form an annular floor round a central cone through which a vertical shaft passes. The Knox pan, fig. 7, may be considered to be fairly typical. It is of cast-iron, four feet in diameter and fourteen inches deep. It has a false bottom to form a hollow annular space through which steam can be introduced. The center of the yoke *d* attached to the muller *m*, is keyed to a vertical wrought-iron shaft *S*, two inches in diameter, which can be brought in connection with the driving gear *G*. The blocks *r, r* are of wood. In working the pan one hundred pounds of skimmings are introduced, and water added until the pulp will



just adhere to a stick. After three hours' grinding the pulp is heated with steam. About five pounds of mercury are added for every charge, together with a cupful of equal parts of saltpeter and sal ammoniac. After three hours further working, water with a little caustic lime is added, and the pulp is discharged first through an upper and then through a lower hole.

One of the greatest difficulties in the treatment of gold by amalgamation, and more particularly in the treatment of pyrites, arises from the so-called sickening or flouring of mercury; that is, the particles, losing their bright metallic surfaces, are no longer capable of coalescing with or taking up other metals. Of the numerous remedies proposed the most efficacious is perhaps sodium amalgam. It appears that amalgamation is often impeded by the tarnish found on the surface of the gold when it is associated with sulphur, arsenic, bismuth, antimony, or tellurium. Wurtz in America (1864) and Crookes in England (1865) made independently the discovery that, by the addition of a small quantity of sodium to the mercury, the operation is much facilitated. It is also stated that sodium prevents both the "sickening" and the "flouring" of the mercury which is produced by certain associated minerals. Cosmo Newberry has investigated with much care the action of certain metals in impeding amalgamation. Wurtz recommends two amalgams, one containing two and the other four per cent. of sodium, and in practice one per cent. or less of these is added to the mercury in the amalgamator. Crookes employs three kinds, which he calls A, B, and C amalgams; each containing three per cent. of mercury, but the B variety has, in addition to the sodium, twenty per cent. of zinc, and C is mixed with ten per cent. of zinc and ten per cent. of tin. The addition of cyanide of potassium has been suggested to assist the amalgamation and to prevent "flouring," but Skey has shown that its use is attended with loss of gold.

*Separation of Gold from the Amalgam.*—The amalgam is first pressed in wetted canvas or buckskin in order to remove excess of mercury. According to Rittinger, mercury will dissolve from 0.05 to 0.08 per cent. of native gold of standard 650 to 850 without loss of fluidity, the solubility of the gold increasing with its fineness; and until the point of saturation is reached, no separation of solid amalgam is possible. Lumps of the solid amalgam, about two inches in diameter, are introduced into an iron vessel lined with a paste of fire-clay and wood ashes, and provided with an iron tube that dips below the surface of water. The distillation is then effected by heating, care being taken that the retort does not become visibly red in daylight. The amalgam yields about 30 to 40 per cent. of gold. In California the amalgam is retorted in cast-iron pans placed in cast-iron cylinders eleven inches in diameter, four feet six inches long, supported on brickwork. The bullion left in the retorts is then melted in black-lead crucibles, with the addition of small quantities of suitable fluxes.

The extraction of gold from auriferous minerals by fusion, except as an incident in their treatment for other metals, is very rarely practiced. It was at one time proposed to treat the concentrated black iron obtained in the Ural gold washings, which consists chiefly of magnetite, as an iron ore, by smelting it with charcoal for auriferous pig-iron, the latter metal possessing the property of dissolving gold in considerable quantity. By subsequent treatment with sulphuric acid the gold could be recovered. Experiments on this point were made by Anossow in 1835, but they have never been followed in practice.

Gold in galena or other lead ores is invariably recovered in the refining or treatment of the lead and

silver obtained. In Colorado the pyritic ores containing gold and silver in association with copper are smelted in reverberatory furnaces for regulus, which, when desilverized by Ziervogel's method, leaves a residue containing twenty or thirty ounces of gold per ton.

*Chlorination Process.*—Plattner suggested that the residues from certain mines at Reichenstein, in Silesia, should be treated with chlorine after the arsenical products had been extracted by roasting. The process, which depends upon the fact that chlorine acts rapidly upon gold, but does not attack ferric oxide, is now adopted in Grass Valley, California, where the waste minerals, principally pyrites from tailings, have been worked for a considerable time by amalgamation. The roasting is conducted at a low temperature in some sort of reverberatory furnace. Salt is added in the roasting to convert all the metals present, except iron, into chlorides. The auric chloride is, however, decomposed at the elevated temperature into finely divided metallic gold, which is then readily attacked by the chlorine gas. The roasted mineral, slightly moistened, is next introduced into a wooden vat, pitched inside, and furnished with a wooden bottom, as shown in fig. 8. Chlorine is led from a suitable generator beneath the false bottom, and rises through the moistened ore, resting on a bed of broken quartz below the false bottom, converting the gold into a soluble chloride, which is afterward removed by washing with water. The precious metal is then precipitated as metallic gold by sulphate of iron. The process has been greatly improved in America by Küstel, Deetken, and Hoffmann; with proper care it is a very perfect one, and yields ninety-seven per cent. of the gold originally present in the ore. It is stated not to cost more in California than \$12.50 a ton. Any silver originally present in the ore is, of course, converted into chloride of silver and remains with the residue, from which it may be extracted by the solvent action of brine or by amalgamation.

*Refining or Parting Gold from other Metals.*—Strabo states that in his time a process was employed for refining and purifying gold in large quantities by cementing or burning it with an aluminous earth, which, by destroying the silver, left the gold in a state of purity. Pliny shows that for this purpose the gold was placed on the fire in an earthen vessel with treble its weight of salt, and that it was afterward again exposed to the fire with two parts of salt and one of argillaceous rock, which, in the presence of moisture, effected the decomposition of the salt; by this means the silver became converted into chloride. In a similar process still practiced in New Granada the granulated argentiferous gold is mixed with one part of common salt and two parts of brickdust. In the presence of moisture, effected by the passage of aqueous vapor through the porous pots in which the moisture is heated, the salt acts on the brickdust, producing silicate of soda, and the evolution of hydrochloric acid affords a source of chlorine for the silver. The chloride of silver formed fuses readily and drops off, exposing a fresh surface of the alloy to the action of the gas.

Various methods for separating gold from silver or other alloys appear to have been in use from ancient times. Among these may be mentioned prolonged oxidation by exposure to air, and treatment with sulphur, sulphide of antimony, and corrosive sublimate. In the Harz two ounces of the granulated alloy of gold and silver were mixed and heated with one ounce of sulphur, litharge being added to separate the gold remaining in the sulphide of silver.

*Parting by Nitric Acid*, the old process of refining, is now practiced in England by only one firm, although



in some refineries both the nitric acid and the sulphuric acid processes are combined, the alloy being first treated with nitric acid. It used to be called "quartation," from the fact that four parts of the alloy best suited for the operation of refining contain three parts of silver and one of gold. The operation may be conducted in vessels of glass or platinum, and each pound of granulated metal is treated with a pound and a quarter of nitric acid of specific gravity 1.32. It is the method employed in the assay of gold. (See ASSAYING.)

*Refining by Sulphuric Acid* is the process usually adopted for separating gold from silver on the large scale. It appears to have been proposed in France by Dizé at the beginning of the present century. It was actually in use in France in 1820, and was introduced into the Mint refinery, London, by Mr. Mathison in 1829. It is based upon the facts that concentrated hot sulphuric acid converts silver and copper into soluble sulphates without attacking the gold, the sulphate of silver being subsequently reduced to the metallic state by copper plates with the formation of sulphate of copper.

About eighty pounds of the granulated alloy are boiled for three or four hours in the platinum vessel (fig. 9) with 2.5 times its weight of sulphuric acid of specific gravity 1.84. The sulphuric acids which arise are partially condensed before being allowed to pass into the air. When the acid has ceased to act on the metal, a small quantity of sulphuric acid of specific gravity 1.53 is added, and, after a second boiling, the contents of the vessel are allowed to settle. The supernatant liquid is then withdrawn from the gold, which falls to the bottom of the vessel, and is diluted until its density is 1.21 or 1.26. The silver is usually precipitated from solution by copper plates, but sometimes iron is used, and the silver is roughly dried and compressed by an hydraulic press before it is melted into ingots. The gold, which is often again treated with sulphuric acid, is then washed and melted into ingots that contain from 997 to 998 parts of gold in 1,000. The operation of parting may be conducted in iron or platinum vessels; the use of the former was advocated by M. Tocchi, and they are still extensively employed. Magnificent vessels of platinum have, however, been made in England by Messrs. Johnson, Matthey & Co. The alloys best suited for the operation contain from 800 to 950 of silver and 50 to 200 of copper and gold, but the proportion of gold must not exceed 200 parts in 1,000. Refiners obtain alloys in suitable proportions by mixing together auriferous silver and argentiferous gold, the proportions of the respective metals having been previously indicated by assay. By such an arrangement, silver which contains but the 0.0004 part of gold, or 2.25 grains in the troy pound, may be profitably treated.

*Cost of Refining.*—The charge to the public for refining depends in a great measure on the amount of metal to be operated upon and its richness. In England, however, it may be considered to be about 1d per ounce for the silver and 4d. per ounce for gold. In France the charge is about 90 centimes to 1 franc 25 centimes for a kilogram of silver.

The Lower Harz smelting works produce annually from fifty to fifty-five cwts. of test silver, of an average fineness of 950 silver and 50 gold per 1,000; the proportion of the latter metal is, however, variable, being lowest (3 per 1000) in the silver obtained from the clean lead ores, and highest (10 per 1000) in that separated from argentiferous copper ores—that from the mixed copper and lead ores being of intermediate richness. The silver, in quantities of twenty-five kilograms, is refined upon small tests in a muffle, and when sufficiently purified is granulated by ladling it into water, whereby thin flattened granules suitable for dissolving are obtained.

The parting vessels (fig. 10) are of porcelain, which, to protect them against fracture by irregular heating, are covered with wire netting and plastered over with a mixture of clay and smithy scales. They are mounted in a frame, and set loose in an iron pot with a hemispherical bottom, which is heated by a fire from below; the pot also serves to catch the contents of the porcelain vessel if the latter should be accidentally broken. The cover is perforated by a hole in the center for the passage of a lead pipe to carry off the sulphurous acid fumes, and a smaller one at one side through which acid may be introduced. These, as well as other connections on the pipes carrying off the vapors, are secured by water-joints. The charge of about 200 ounces (6.25 kilograms) of granulated silver is treated with twice its weight of sulphuric acid marking 66° Baumé, and, by careful firing, is dissolved in six hours. The proper management of the heat is of importance, as neglect in the conduct of the operation may easily lead to a breakage of the pot. When the charge is completely dissolved the liquid is allowed to settle for some time, and is then poured off into a lead pan, where the silver sulphate solidifies. This, when redissolved by an addition of water and careful warming, is treated with strips of copper, the separation of the silver being facilitated by agitating the liquid. When the latter is found to be completely free from silver the heating is stopped, and the contents of the pan are allowed to settle for eighteen hours, when the copper solution is drawn off by a siphon and sent to the vitriol crystallizers. In the precipitation of 100 kilograms of silver about thirty kilograms of sheet-copper are expended.

The precipitated silver is washed with water in a copper vessel upon a linen filter until the reaction of copper in the washings ceases, and then molded in cylindrical blocks by screw pressure, to express the residual water. These, when fire-dried, are melted in black-lead pots, holding seventy-five lbs., with the addition of a little soda nitre.

The parted gold remaining in the porcelain pot, though already sensibly finer than is usual when iron parting vessels are used, still contains silver, and is therefore boiled once more with sulphuric acid of 66° Baumé. Afterward it is washed with water until silver can be no longer detected in the washings, when it is transferred to a porcelain dish and dried. When a quantity of about ten pounds of gold has been accumulated, it is mixed with a little borax glass, melted in a black-lead pot, and cast. The resulting bars average  $\frac{985}{1000}$  fine.

*Refining by Chlorine Gas.*—F. Bowyer Miller devised in 1867 the following method for separating silver from gold. The process, which is the one now adopted in the Australian mints, consists in converting the silver into chloride by the passage of a stream of chlorine gas through the molten alloy. Clay crucibles are employed after having been saturated with a strong solution of borax and allowed to dry. The chlorine is introduced through the gold by a clay pipe passing to the bottom of the crucible, and connected with the chlorine generator in which the necessary pressure is obtained by a pressure tube eight feet high. The chloride of silver is easily poured off from the surface of the molten metal, and by carefully fusing with a little carbonate of soda, the small amount of gold it retains is separated and falls to the bottom of the crucible. The gold operated upon contains from 3 to 12 per cent. of silver, and the average fineness of the refined gold is 994. The operation is now conducted on a considerable scale in Australia, and in the years 1871 and 1872 no less than 1,100,000 ounces of gold were refined by its aid in Sydney alone. The absolute loss of gold does not exceed fourteen parts in 100,000.



*Toughening Brittle Gold.*—It will be seen from page 751 that minute traces of certain metals, which do not exceed the  $\frac{1}{1020}$  part of the mass, render gold brittle and unfit for coinage. Miller showed that the removal of the deleterious metals might be effected by converting them into volatile chlorides by a stream of chlorine gas. The process was introduced into the English mint by Roberts, who successfully treated over 40,000 ounces of brittle gold with but trifling loss of precious metal. Wagner has suggested that bromine may replace chlorine in Miller's process. Brittle gold may also be toughened by throwing a small quantity of corrosive sublimate onto the surface of the molten metal, but this method is wasteful, and the fumes evolved are deleterious. The late Mr. Warrington proposed to toughen brittle gold by the addition of about 10 per cent. of black oxide of copper. The process is efficacious, but the crucibles become much corroded and even perforated; the standard fineness of the gold is, moreover, lowered by such copper as is reduced to the metallic state. If gold is but slightly brittle, it may be toughened by pouring it in a thin stream through atmospheric air into a crucible lined with borax, or by the addition of a small quantity of chloride of copper.

*Preparation of Pure Gold.*—Chemically pure gold may be prepared by several methods. The metal, either in the form of powder or "cornets" from the purest gold that can be obtained, is dissolved in nitro-hydrochloric acid. The excess of acid is driven off, alcohol and chloride of potassium added to precipitate platinum, and the chloride of gold is then dissolved in pure distilled water, the solution being diluted until each gallon does not contain more than half an ounce of the precious metal. The solution is allowed to stand for several weeks, and the supernatant liquid is carefully removed by a siphon from any chloride of silver that may have fallen to the bottom of the vessel. The gold may then be precipitated by a stream of carefully washed sulphurous anhydride, or by the addition of oxalic acid, formic acid, or ferrous sulphate. The spongy gold is washed with dilute hydrochloric acid, distilled water, ammonia water, and again with distilled water, after which it is melted in a clay crucible with a little bisulphate of potash and borax, and poured into a stone mold. Roberts prepared by this method seventy ounces of gold, of which the average purity was 999.96, the precipitant being oxalic acid. Gold precipitated by oxalic acid from an acid solution containing copper is always contaminated with cupric oxalate. E. Purgotti has, however, shown that by heating the solution with the addition of potash, a soluble double oxalate of copper and potash is formed, and the gold is left in the pure state.

It will be convenient to give here, in connection with the article GOLD, rather than in their proper alphabetical place, the articles GOLDBEATING and GOLD LACE.

**GOLDBEATING.** The art of goldbeating is of great antiquity, being referred to by Homer; and Pliny states that one ounce of gold was extended to 750 leaves, each leaf being four fingers square, which is three times the thickness of the ordinary leaf gold of the present time. In all probability the art originated among Oriental communities, where the working of gold and the use of gold ornaments have been distinguishing characteristics from the most remote periods; and in India goldbeating is still carried on as a craft, involving many mysteries and great difficulties.

The process of goldbeating is thus conducted. The gold, having been alloyed according to the color desired, is melted in a crucible, at a higher temperature than is simply necessary to fuse it, as its malleability is improved by exposure to a greater heat; sudden cooling does not

interfere with its malleable properties, gold differing in this respect from some other metals. It is then cast into an ingot, and flattened, by rolling between a pair of powerful smooth steel rollers, into a ribbon of one-and-a-half inches wide and ten feet in length to the ounce. After being flattened it is annealed and cut into pieces of about six-and-a-half grains each, or about seventy-five per ounce, and placed between the leaves of a "cutch," which is about half an inch thick and three-and-a-half inches square, containing about 180 leaves of a tough paper manufactured in France. Formerly fine vellum was used for this purpose, and generally still it is interleaved in the proportion of about one of vellum to six of paper. The cutch is beaten on for about twenty minutes with a seventeen-pound hammer, which rebounds by the elasticity of the skin, and saves the labor of lifting, by which the gold is spread to the size of the cutch; each leaf is then taken out, and cut into four pieces, and put between the skins of a "shoder," four-and-a-half inches square and three-fourths of an inch thick, containing about 720 skins, which have been worn out in the finishing or "mold" process. The shoder requires about two hours' beating upon with a nine-pound hammer. As the gold will spread unequally, the shoder is beaten upon after the larger leaves have reached the edges. The effect of this is that the margins of larger leaves come out of the edges in a state of dust. This allows time for the smaller leaves to reach the full size of the shoder, thus producing a general evenness of size in the leaves. Each leaf is again cut into four pieces, and placed between the leaves of a "mold," composed of about 950 of the finest gold-beaters' skins, five inches square and three-quarters of an inch thick, the contents of one shoder filling three molds. The material has now reached the last and most difficult stage of the process; and on the fineness of the skin and the judgment of the workman the perfection and thinness of the leaf of gold depend. During the first hour the hammer is allowed to fall principally upon the center of the mold. This causes gaping cracks upon the edges of the leaves, the sides of which readily coalesce and unite without leaving any trace of the union after being beaten upon. At the second hour, when the gold is about the one-hundred-and-fifty-thousandth part of an inch in thickness, it for the first time permits the transmission of the rays of light. In pure gold, or gold but slightly alloyed, the green rays are transmitted; and in gold highly alloyed with silver, the pale violet rays pass. The mold requires in all about four hours' beating with a seven-pound hammer, when the ordinary thinness for the gold leaf of commerce will be reached. A single ounce of gold will at this stage be extended to  $75 \times 4 \times 4 = 1,200$  leaves, which will trim to squares of about three-and-a-quarter inches each. The finished leaf is then taken out of the mold, and the rough edges are trimmed off by slips of the ratan fixed in parallel grooves of an instrument called a wagon, the leaf being laid upon a leathern cushion for that purpose. The sizes to which British leaf is cut are 3,  $3\frac{1}{8}$ ,  $3\frac{1}{4}$ ,  $3\frac{3}{8}$ , and  $3\frac{1}{2}$  inches. The leaves thus prepared are placed into "books" capable of holding twenty-five leaves each, which have been rubbed over with red ochre to prevent the gold clinging to the paper. The leaf is used for gilding picture-frames, and for other ornamental purposes. (See GILDING.)

**GOLD AND SILVER LACE.** Under this heading a general account may be given of the use of the precious metals in textiles of all descriptions into which they enter. That these metals were used largely in the sumptuous textiles of the earliest periods of civilization there is abundant testimony; and to this day, in the Oriental centers whence a knowledge and the use of



fabrics inwoven, ornamented and embroidered with gold and silver first spread, the passion for such brilliant and costly textiles is still most strongly and generally prevalent. The earliest mention of the use of gold in a woven fabric occurs in the description of the ephod made for Aaron. In both the *Iliad* and the *Odyssey* distinct allusion is frequently made to inwoven and embroidered golden textiles. Many circumstances point to the conclusion that the art of weaving and embroidering with gold and silver originated in India, where it is still principally prosecuted, and that from one great city to another the practice traveled westward.

The basis of all modern fabrics of this kind is wire, the "gold wire" of the manufacturer being in all cases silver gilt wire, and silver wire being, of course, composed of pure silver. In India the wire is drawn by means of simple draw-plates, with rude and simple appliances, from rounded bars of silver, or gold-plated silver, as the case may be. The wire is flattened into the strip or ribbon-like form it generally assumes by passing it, fourteen or fifteen strands simultaneously, over a fine, smooth, round-topped anvil, and beating it as it passes with a heavy hammer having a slightly convex surface. From wire so flattened there is made in India *soniri*, a tissue or cloth of gold, the web or warp being composed entirely of golden strips, and *ruperi*, a similar tissue of silver. Gold lace is also made on a warp of thick yellow silk with a weft of flat wire, and in the case of ribbons the warp or web is composed of the metal. The flattened wires are twisted around orange (in the case of silver, white) colored silk thread, so as completely to cover the thread and present the appearance of a continuous wire; and in this form it is chiefly employed for weaving into the rich brocades known as kincobs or kinkhabs. Wires flattened, or partially flattened, are also twisted into exceedingly fine spirals, and in this form they are the basis of numerous ornamental applications.

Among the western communities the demand for gold and silver lace and embroideries arises chiefly in connection with naval and military uniforms, court costumes, public and private liveries, ecclesiastical robes and draperies, theatrical dresses, and the badges and insignia of various orders. To a limited extent there is a trade in gold wire and lace to India and China.

GOLDAST, MELCHIOR HAIMINSFELD, an historical writer and collector whose works did great service to the study of the older documents of Germany, was born, January 6, 1576 (or 1578), and died in 1635.

GOLDBERG, a town in the Prussian province of Silesia, capital of a circle in the government district of Liegnitz, is situated fourteen miles southwest of that town, on the Katzbach, an affluent of the Oder.

GOLD COAST, a British colony in Western Africa reconstituted on July 24, 1876, by a royal charter which defines it as consisting of two settlements—(1) the Gold Coast proper, "between the fifth degree of west longitude and the second degree of east longitude; and (2) the settlement of Lagos, similarly comprising all possessions between the second and fifth degrees of east longitude." The charter appoints a governor, establishes a legislative and an executive council, and authorizes the appointment of judges and other legal officers, etc. Both the Gold Coast colony and Lagos had previously been administered by lieutenant-governors dependent on the governor of Sierra Leone.

GOLDEN BULL (Latin, *BULLA AUREA*) is, in general, the designation of any charter decorated with a golden seal or *bull*, either from the intrinsic importance of its contents, or from the rank and dignity of the bestower or the recipient. But the name has become

practically restricted to a few documents of unusual political importance, the golden bull of the Empire, the golden bull of Brabant, the golden bull of Hungary, and the golden bull of Milan—and of these the first is undoubtedly *the golden bull par excellence*.

It was drawn up under the direction of the emperor Charles IV., and it was formerly ratified in 1356—the first twenty-three chapters by the diet of Nuremberg (January 10th), and the remaining seven by the diet of Metz (December 25th). The exordium is a strangely rhetorical lamentation over the miseries of division, and more especially of a kingdom divided against itself; and the body of the document gives a survey of the duties, privileges, and relations of the various dignitaries of the empire, the emperor, the electors ecclesiastical and secular, the electoral plenipotentiaries, and the officers of the court. As might also be expected, a large place is given to rules of ceremony and etiquette. At first the document was known simply as the *Lex Carolina*; but by and by the name of the book with the Golden Bull came into use, and the present elliptical title was sufficiently established by 1417 to be officially employed in a charter by King Sigismund.

GOLDEN-EYE, a name indiscriminately given in many parts of Britain to two very distinct species of ducks, from the rich yellow color of their irides. The commonest of them—the *Anas fuligula* of Linnæus, and *Fuligula cristata* of most modern ornithologists—is, however, usually called by English writers the Tufted Duck, while "Golden-eye" is reserved in books for the *A. clangula* and *A. glaucion* of Linnæus, who did not know that the birds he so named were but examples of the same species, differing only in age or sex.

The Golden-eye of North America has been by some authors deemed to differ, and has been named *C. americano*, but apparently on insufficient grounds. That country, however, has, in common with Iceland, a very distinct species, *C. islandica*, often called Barrow's Duck, which is but a rare straggler to the continent of Europe. The New World also possesses a third and still more beautiful species of the genus in *C. albeola*, known in books as the Buffet-headed Duck, and to American fowlers as the "Spirit-Duck" and "Butterball."

GOLDEN FLEECE. See ARGONAUTS.

GOLDEN LEGEND. See VORAGINE, JACOBUS DE.

GOLDEN ROSE, an ornament, made of wrought gold and set with gems, which is blessed by the pope on the fourth (Lætare) Sunday of Lent, and usually afterward sent as a mark of special favor to some distinguished individual, church, or civil community.

GOLDFINCH, the *Fringilla carduelis* of Linnæus and the *Carduelis elegans* of later authors, an extremely well-known bird found over the greater parts of Europe and North Africa, and eastward to Persia and Turkistan. Its gay plumage is matched by its sprightly nature, and, together, they make it one of the most favorite cage-birds among all classes. As a songster it is, indeed, surpassed by many other species, but its docility and ready attachment to its master or mistress makes up for any defect in its vocal powers.

GOLDFISH (*Carassius auratus*). In China and the warmer parts of Japan a fish extremely similar to the Crucian carp of Europe is of very common occurrence in ponds and other still waters. In the wild state its colors do not differ from those of a Crucian carp, and, like that fish, it is tenacious of life and easily domesticated. Albinos seem to be rather common, and, as in other fishes (for instance the tench, carp, eel, flounder), the color of most of these albinos is a bright orange or golden yellow; occasionally even this shade of color is lost, the fish being more or less pure white or silvery.



The Chinese have domesticated these albinos for a long time, and, by careful selection, have succeeded in propagating all those strange varieties, and even monstrosities, which appear in every domestic animal. In some individuals the dorsal fin is only half its normal length, in others entirely absent; in others the anal fin has a double spine, in others all the fins are nearly double the usual length. The snout is frequently malformed, giving the head of the fish an appearance similar to that of a bull-dog. The variety most highly prized at present has an extremely short snout, eyes which almost wholly project beyond the orbit, no dorsal fin, and a very long three or four-lobed caudal fin (Telescope-fish). The goldfish is now distributed over nearly all the civilized parts of the world.

**GOLD HILL**, a town of Storey county, Nevada, United States, is situated at the head of a precipitous ravine of the Nevada mountains, one mile south of Virginia city, and 328 miles east from San Francisco by rail. The name was derived from a small hill connected with the famous Comstock lode, and containing rich golden ore. Some of the most valuable mines of this lode are within the limits of the town, the average yield being about two million dollars monthly in gold and silver. Though there are some quartz mills within the town, the greater part of the ore is conveyed to the mills on Carson river. There is a fine hall in connection with the miners' union, and another has been erected by the Oddfellows and Freemasons. The Methodists, Episcopalians, and Roman Catholics are the principal denominations of the town. Gold Hill obtains its water supply in conjunction with Virginia from the summit of the Sierra Nevada, twenty-five miles distant. Pop. (1889), 3,000.

**GOLDINGEN**, in Lettish **KULDIGA**, a district town of the Russian province of Courland, on the left bank of the Windau, which forms a beautiful waterfall — the Rummel — in the neighborhood.

**GOLD LACE**. See under **GOLD**.

**GOLDONI**, **CARLO**, the most illustrious of the Italian comedy-writers, and the real founder of modern Italian comedy, was born at Venice in 1707. He died in 1793.

**GOLDSBORO**, a railroad town of Wayne county, N. C. It has some manufactures, and considerable trade with the surrounding country; its banking and telegraph facilities are ample, and its population numbers (1890) 5,500.

**GOLDSCHMIDT**, **HERMANN**, a German painter and astronomer, was the son of a Jewish merchant, and was born at Frankfort on June 17, 1802. He died in 1866.

**GOLDSMITH**, **OLIVER**, one of the most pleasing English writers of the eighteenth century.

At Pallas Oliver Goldsmith was born in November, 1728. That spot was then, for all practical purposes, almost as remote from the busy and splendid capital in which his later years were passed as any clearing in Upper Canada or any sheep walk in Australasia now is.

While Oliver was still a child his father was presented to a living worth about £200 a year, in the county of West Meath. The family accordingly quitted their cottage in the wilderness for a spacious house on a frequented road, near the village of Lissoy. Here the boy was taught his letters by a maid-servant, and was sent in his seventh year to a village school kept by an old quartermaster on half-pay, who professed to teach nothing but reading, writing, and arithmetic, but who had an inexhaustible fund of stories about ghosts, banishees, and fairies, about the great Rapparee chiefs, Baldearg O'Donnell and galloping Hogan, and about the exploits of Peterborough and Stanhope, the surprise of Monjuich, and the glorious disaster of Brihuega.

From the humble academy kept by the old soldier Goldsmith was removed in his ninth year. He went to several grammar schools, and acquired some knowledge of the ancient languages. His life at this time seems to have been far from happy. He had, as appears from the admirable portrait of him at Knowle, features harsh even to ugliness. The small-pox had set its mark on him with more than usual severity. His stature was small, and his limbs ill put together. Among boys little tenderness is shown to personal defects; and the ridicule excited by poor Oliver's appearance was heightened by a peculiar simplicity and a disposition to blunder, which he retained to the last. He became the common butt of boys and masters, was pointed at as a fright in the playground, and flogged as a dunce in the school-room. When he had risen to eminence, those who had once derided him ransacked their memory for the events of his early years, and recited repartees and couplets which had dropped from him, and which, though little noticed at the time, were supposed, a quarter of a century later, to indicate the powers which produced the *Vicar of Wakefield* and the *Deserted Village*.

In his seventeenth year Oliver went up to Trinity College, Dublin, as a sizar. The sizars paid nothing for food and tuition, and very little for lodging; but they had to perform some menial services from which they have long been relieved. They swept the court, they carried up the dinner to the fellows' table, and changed the plates, and poured out the ale of the rulers of the society. Goldsmith was quartered, not alone, in a garret, on the window of which his name, scrawled by himself, is still read with interest. From such garrets many men of less parts than his have made their way to the woolsack or to the episcopal bench. But Goldsmith, while he suffered all the humiliations, threw away all the advantages of his situation. He neglected the studies of the place, stood low at the examinations, was turned down to the bottom of his class for playing the buffoon in the lecture-room, was severely reprimanded for pumping on a constable, and was caned by a brutal tutor for giving a ball in the attic story of the college to some gay youths and damsels from the city.

While Oliver was leading at Dublin a life divided between squalid distress and squalid dissipation, his father died, leaving a mere pittance. The youth obtained his bachelor's degree, and left the university. During some time the humble dwelling to which his widowed mother had retired was his home. He was now in his twenty-first year; it was necessary that he should do something; and his education seemed to have fitted him to do nothing but to dress himself in gaudy colors, of which he was as fond as a magpie, to take a hand at cards, to sing Irish airs, to play the flute, to angle in summer, and to tell ghost stories by the fire in winter. He tried five or six professions in turn without success. He applied for ordination; but, as he applied in scarlet clothes, he was speedily turned out of the episcopal palace. He then became tutor in an opulent family, but soon quitted his situation in consequence of a dispute about play. Then he determined to emigrate to America. His relations, with much satisfaction, saw him set out for Cork on a good horse, with £30 in his pocket. But in six weeks he came back on a miserable hack, without a penny, and informed his mother that the ship in which he had taken his passage, having got a fair wind while he was at a party of pleasure, had sailed without him. Then he resolved to study the law. A generous kinsman advanced £50. With this sum Goldsmith went to Dublin, was enticed into a gaming house, and lost every shilling. He then thought of medicine. A small purse was made up; and in his twenty-fourth year he was sent to Edinburgh.



At Edinburgh he passed eighteen months in nominal attendance on lectures, and picked up some superficial information about chemistry and natural history. Thence he went to Leyden, still pretending to study physic. He left that celebrated university, the third university at which he had resided, in his twenty-seventh year, without a degree, with the merest smattering of medical knowledge, and with no property but his clothes and his flute. His flute, however, proved a useful friend. He rambled on foot through Flanders, France, and Switzerland, playing tunes which everywhere set the peasantry dancing, and which often procured for him a supper and a bed. He wandered as far as Italy.

In 1756 the wanderer landed at Dover, without a shilling, without a friend, and without a calling. He had indeed, if his own unsupported evidence may be trusted, obtained from the university of Padua a doctor's degree; but this dignity proved utterly useless to him. In England his flute was not in request; there were no convents; and he was forced to have recourse to a series of desperate expedients. He turned strolling player; but his face and figure were ill suited to the boards even of the humblest theater. He pounded drugs and ran about London with phials for charitable chemists. He joined a swarm of beggars, which made its nest in Axe Yard. He was for a time usher of a school, and felt the miseries and humiliations of this situation so keenly that he thought it a promotion to be permitted to earn his bread as a bookseller's hack; but he soon found the new yoke more galling than the old one, and was glad to become an usher again. He obtained a medical appointment in the service of the East India Company; but the appointment was speedily revoked. Why it was revoked we are not told. The subject was one on which he never liked to talk. It is probable that he was incompetent to perform the duties of the place. Then he presented himself at Surgeon's Hall for examination, as mate to a naval hospital. Even to so humble a post he was found unequal. By this time the schoolmaster whom he had served for a morsel of food and the third part of a bed was no more. Nothing remained but to return to the lowest drudgery of literature. Goldsmith took a garret in a miserable court, to which he had to climb from the brink of Fleet Ditch by a dizzy ladder of flagstones called Breakneck Steps. The court and the ascent have long disappeared, but old Londoners well remember both. Here, at thirty, the unlucky adventurer sat down to toil like a galley slave.

In the succeeding six years he sent to the press some things which have survived, and many which have perished. He produced articles for reviews, magazines, and newspapers; children's books, which, bound in gilt paper and adorned with hideous woodcuts, appeared in the window of the once far-famed shop at the corner of Saint Paul's Churchyard; *An Inquiry into the State of Polite Learning in Europe*, which, though of little or no value, is still reprinted among his works; a *Life of Beau Nash*, which is not reprinted, though it well deserves to be so, a superficial and incorrect, but very readable, *History of England*, in a series of letters purporting to be addressed by a nobleman to his son; and some very lively and amusing *Sketches of London Society*, in a series of letters purporting to be addressed by a Chinese traveler to his friends. All these works were anonymous; but some of them were well known to be Goldsmith's; and he gradually rose in the estimation of the booksellers for whom he drudged. He was, indeed, emphatically a popular writer.

As his name gradually became known, the circle of his acquaintance widened. He was introduced to Johnson, who was then considered as the first of living English writers; to Reynolds, the first of English paint-

ers; and to Burke, who had not yet entered parliament, but had distinguished himself greatly by his writings and by the eloquence of his conversation. With these eminent men Goldsmith became intimate. In 1763 he was one of the nine original members of that celebrated fraternity which has sometimes been called the Literary Club, but which has always disclaimed that epithet, and still glories in the simple name of the Club.

By this time Goldsmith had quitted his miserable dwelling at the top of Breakneck Steps, and had taken chambers in the more civilized region of the Inns of Court. But he was still often reduced to pitiable shifts. Toward the close of 1764 his rent was so long in arrear that his landlady one morning called in the help of a sheriff's officer. The debtor, in great perplexity, dispatched a messenger to Johnson; and Johnson, always friendly, though often surly, sent back the messenger with a guinea, and promised to follow speedily. He came, and found that Goldsmith had changed the guinea, and was railing at the landlady over a bottle of madeira. Johnson put the cork into the bottle, and entreated his friend to consider calmly how money was to be procured. Goldsmith said that he had a novel ready for the press. Johnson glanced at the manuscript, saw that there were good things in it, took it to a bookseller, sold it for £60, and soon returned with the money. The rent was paid; and the sheriff's officer withdrew. According to one story, Goldsmith gave his landlady a sharp reprimand for her treatment to him; according to another, he insisted on her joining him in a bowl of punch. Both stories are probably true. The Novel which was thus ushered into the world was the *Vicar of Wakefield*.

But before the *Vicar of Wakefield* appeared in print, came the great crisis of Goldsmith's literary life. In Christmas week, 1764, he published a poem, entitled the *Traveller*. It was the first work to which he had put his name, and it at once raised him to the rank of a legitimate English classic. The opinion of the most skillful critics was that nothing finer had appeared in verse since the fourth book of the *Dunciad*. In one respect the *Traveller* differs from all Goldsmith's other writings. In general his designs were bad, and his execution good. In the *Traveller*, the execution, though deserving of much praise, is far inferior to the design.

While the fourth edition of the *Traveller* was on the counters of the booksellers, the *Vicar of Wakefield* appeared, and rapidly obtained a popularity which has lasted down to our own time, and which is likely to last as long as our language.

The success which had attended Goldsmith as a novelist emboldened him to try his fortune as a dramatist. He wrote the *Goodnatured Man*, a piece which had a worse fate than it deserved. Garrick refused to produce it at Drury Lane. It was acted at Covent Garden in 1768, but was coldly received. The author, however, cleared by his benefit nights, and by the sale of the copyright, no less than £500, five times as much as he had made by the *Traveller* and the *Vicar of Wakefield* together.

In 1770 appeared the *Deserted Village*. In mere diction and versification this celebrated poem is fully equal, perhaps superior, to the *Traveller*; and it is generally preferred to the *Traveller* by that large class of readers who think, with Bayes in the *Rehearsal*, that the only use of a plan is to bring in fine things.

In 1773 Goldsmith tried his chance at Covent Garden with a second play, *She Stoops to Conquer*. The manager was, not without great difficulty, induced to bring this piece out. The sentimental comedy still reigned, and Goldsmith's comedies were not sentimental. The *Goodnatured Man* had been too funny to succeed; yet the mirth of the *Goodnatured Man* was sober when compared with the rich drollery of *She Stoops to Con-*



*quer*, which is, in truth, an incomparable farce in five acts. On this occasion, however, genius triumphed. Pit, boxes, and galleries were in a constant roar of laughter. If any bigoted admirer of Kelly and Cumberland ventured to hiss or groan, he was speedily silenced by a general cry of "turn him out," or "throw him over." Three generations have since confirmed the verdict which was pronounced on that night.

While Goldsmith was writing the *Deserted Village* and *She Stoops to Conquer*, he was employed on works of a very different kind, works from which he derived little reputation but much profit. He compiled for the use of schools a *History of Rome*, by which he made £300; a *History of England*, by which he made £600; a *History of Greece*, for which he received £250; a *Natural History*, for which the booksellers covenanted to pay him 800 guineas. These works he produced without any elaborate research, by merely selecting, abridging, and translating into his own clear, pure, and flowing language, what he found in books well known to the world, but too bulky or too dry for boys and girls. He committed some strange blunders, for he knew nothing with accuracy.

Yet, ignorant as Goldsmith was, few writers have done more to make the first steps in the laborious road to knowledge easy and pleasant. His compilations are widely distinguished from the compilations of ordinary bookmakers. He was a great, perhaps an unequalled, master of the arts of selection and condensation.

Goldsmith might now be considered as a prosperous man. He had the means of living in comfort, and even in what to one who had so often slept in barns and on bulks must have been luxury. His fame was great and was constantly rising. He lived in what was intellectually far the best society of the kingdom, in a society in which no talent or accomplishment was wanting, and in which the art of conversation was cultivated with splendid success. There probably were never four talkers more admirable in four different ways than Johnson, Burke, Beauclerk and Garrick; and Goldsmith was on terms of intimacy with all the four. He aspired to share in their colloquial renown, but never was ambition more unfortunate. It may seem strange that a man who wrote with so much perspicuity, vivacity and grace should have been, whenever he took a part in conversation, an empty, noisy, blundering rattle. But on this point the evidence is overwhelming. So extraordinary was the contrast between Goldsmith's published works and the silly things which he said, that Horace Walpole described him as an inspired idiot.

His associates seem to have regarded him with kindness, which, in spite of their admiration of his writings, was not unmixed with contempt. In truth, there was in his character much to love, but very little to respect.

Goldsmith has sometimes been represented as a man of genius, cruelly treated by the world, and doomed to struggle with difficulties, which at last broke his heart. But no representation can be more remote from the truth. He did, indeed, go through much sharp misery before he had done anything considerable in literature. But after his name had appeared on the title-page of the *Traveller*, he had none but himself to blame for his distress. His average income, during the last seven years of his life certainly exceeded £400, and £400 a year ranked, among the incomes of that day, at least as high as £800 a year would rank at present. A single man living in the Temple, with £400 a year, might then be called opulent. Not one in ten of the young gentlemen of good families who were studying the law there had so much. But all the wealth which Lord Clive had brought from Bengal, and Sir Law-

rence Dundas from Germany, joined together, would not have sufficed for Goldsmith. He spent twice as much as he had. He wore fine clothes, gave dinners of several courses, paid court to venal beauties. He had also, it should be remembered, to the honor of his heart, though not of his head, a guinea, or five, or ten, according to the state of his purse, ready for any tale of distress, true or false. But it was not in dress or feasting, in promiscuous amours or promiscuous charities, that his chief expense lay. He had been from boyhood a gambler, and at once the most sanguine and the most unskillful of gamblers. For a time he put off the day of inevitable ruin by temporary expedients. He obtained advances from booksellers, by promising to execute works which he never began. But at length this source of supply failed. He owed more than £2,000; and he saw no hope of extrication from his embarrassments. His spirits and health gave way. He was attacked by a nervous fever, which he thought himself competent to treat. It would have been happy for him if his medical skill had been appreciated as justly by himself as by others. Notwithstanding the degree which he pretended to have received at Padua, he could procure no patients. Goldsmith now, in spite of the example of others, took his own medicine. The remedy aggravated the malady. The sick man was induced to call in real physicians; and they at one time imagined that they had cured the disease. Still his weakness and restlessness continued. He could get no sleep. He could take no food. "You are worse," said one of the medical attendants, "than you should be from the degree of fever which you have. Is your mind at ease?" "No; it is not," were the last recorded words of Oliver Goldsmith. He died on April 3, 1774, in his forty-sixth year. He was laid in the churchyard of the Temple; but the spot was not marked by any inscription, and is now forgotten. The coffin was followed by Burke and Reynolds. Both these great men were sincere mourners. Burke, when he heard of Goldsmith's death, had burst into a flood of tears. Reynolds had been so much moved by the news that he had flung aside his brush and palette for the day.

GOLDSTÜCKER, THEODOR, an eminent Sanskrit scholar, was born of Jewish parents at Königsberg on January 18, 1821, and died in 1872.

GOLF (in its older forms GOFF, GOUFF, or GOWFF, the last of which gives the genuine old pronunciation) is an amusement so peculiar to Scotland and so prevalent there that—unless curling may be held to dispute the place with it—it may be called, *par excellence*, the national game. There seems little doubt the word is derived from the German *kolbe*, a club—in Dutch, *kolf*,—which last is nearly in sound identical, and might give inference for the game of a Dutch origin.

Golf may be practiced on any good stretch of meadowland, where the grass is not too rank; but the ground best suited for the purpose is a reach of undulating down-country, such as is common on the seaboard,—sandy in soil, and as such covered with a short crisp turf, occasionally broken up by sandholes or "bunkers," and provided, in addition, with a fair supply of gorse or whin. These "bunkers" and whins constitute the main "hazards" of the game, in the avoidance of which skill in it is specially shown; and without a fair provision of them, no golfing "links" or "green" can be held to approach the ideal standard. Small holes, of about four inches diameter, are punched in the turf at distances indefinitely variable, but ranging from 100 to 400 or 500 yards; and from one of these holes into the next in order, a ball of gutta percha of about one and three fourths ounces has to be driven with implements (clubs) of some variety devised for the purpose.



Their variety is determined by this, that while, in starting from the hole, the ball may be *teed* (*i.e.*, placed where the player chooses, with a little pinch of sand under it called a *tee*), it must in every other case be played strictly from its place as it chances to lie,—in sand, whin, or elsewhere,—a different club being necessary in each particular difficulty. These clubs may generally be defined as shafts of wood, with so-called *heads* of wood or iron attached. Starting from the one hole, it is the immediate aim of the player to drive his ball as far toward the next as he can. Having got within some moderate distance of it, he proceeds to make his "approach shot," carefully selecting the appropriate implement. When he has reached the "putting green,"—a smooth space carefully chosen for the purpose,—he essays to put (or putt) his ball into the hole; and generally, if he does it in two strokes, he may be held skillful or fortunate. The player who holes his ball in the smallest number of strokes is, as matter of course, winner of the hole.

GOLGOTHA, "the place of a skull," the scene of the crucifixion of the Savior. Why it was called "the place of a skull" has been keenly debated, whether from the skulls of criminals lying about there, or from its being a round, bare, skull-like hillock. The latter is probably the true explanation; though none of the Evangelists offers any warranty for the current phrase, "*Mount Calvary*." It lay outside and north of the city of Jerusalem.

GOLIUS, JACOBUS, Orientalist, was born at the Hague in 1596, and died in 1667.

GOLLNOW, a town in the Prussian province of Pomerania, government district of Stettin, is situated on the right bank of the Ilna, fourteen miles north-northeast of Stettin, with which it has communication by steamer.

GÖLNITZ, or GÖLLNITZ, a mining town of Hungary, on a river of the same name, in the county of Szepes (Zips). Gölnitz was formerly a royal free town; its chief importance now is as a mining center.

GOLOVNIN, VASILY MIKHAILOVICH, a Russian vice-admiral, was born April 20, 1776, and died July 12, 1831.

GÖLTZ, BOGUMIL, humorist and satirist, was born of a German family settled at Warsaw March 20, 1881, and died in 1870.

GOLTZIUS, HENDRIK, a Dutch painter and engraver, was born in 1558 at Mülebrecht, in the duchy of Juliers, and died in 1617. His portraits, though mostly miniatures, are master-pieces of their kind, both on account of their exquisite finish, and as fine studies of individual character. Of his larger heads, the life-size portrait of himself is probably the most striking example.

GOMARUS, FRANCIS, a professor of theology at Leyden, was born at Bruges on January 30, 1563, and died in 1641.

GOMBROON, another name for BENDER-ABBASI (*q.v.*)

GOMER, the eldest son of Japhet, and an ally of Gog, has usually, since Calmet's time, been identified with those Cimmerii who, originally inhabiting the districts to the northeast and north of the Black Sea and Sea of Azoff, at an early period began to penetrate as far as to Asia Minor, and, in the seventh century B.C., overran Lydia, though without leaving permanent traces of their presence. This identification, however, is to be met with in none of the older writers. Josephus understands the Galatians of northern Phrygia to be intended, and Gimmeri or Gamir was, in the language of the ancient Armenians, a usual designation for their neighbors, the Cappadocians.

GONDA, a district of Oudh, bounded on the north by the lower range of the Himálayas, on the east by Basti district, on the south by Fyzabad and Bara Banki, and on the west by Bharaich, and having an area of 2,824 square miles.

GONDA, the chief town and administrative headquarters of Gonda district. The site on which the town now stands was originally a jungle, in the center of which was a cattle fold (Gontha or Gothán), in which the cattle were inclosed at night as a protection against wild beasts, and from this the town derived its name.

GONDAR, properly GUENDAR, a town of Abyssinia, formerly the capital of the Amharic kingdom, is situated on a basaltic ridge in the country of Dembea, about twenty-one miles northeast of Lake Tsana or Tana, a splendid view of which is obtained from the castle.

GONDOKORO. See ISMAILIA.

GONDWÁNA, a tract of country in Central India, extending from the 19th to the 25th degree N. latitude, deriving its name from the aboriginal tribes of *Gonds*, who form the predominant element in the population. The tract may be considered as comprising part of the British territory of Ságor and Nerbudda, with the districts of Singraulí, Chotá Nágpur and Sirguja, the petty native states on the southwest frontier of Bengal, the Cuttack Mahals, and the northern portion of Nágpur. It is estimated to be 400 miles in length by 280 in average breadth.

GONG (Chinese, *gong-gong* or *tam-tam*), a sonorous or musical instrument of Chinese origin and manufacture, made in the form of a broad thin disk with a deep rim. Gongs vary in diameter from about twenty to forty inches, and they are made of bronze containing a maximum of twenty-two parts of tin to seventy-eight of copper; but in many cases the proportion of tin is considerably less. The gong is beaten with a round, hard, leather-covered pad, fitted on a short stick or handle. It emits a peculiarly sonorous sound, its complex vibrations bursting into a wave-like succession of tones, sometimes shrill, sometimes deep.

GÓNGORA Y ARGOTE, LUIS DE, Spanish lyric poet, was born at Cordova, on July 11, 1561, and died in 1627.

GONIOMETER. Strictly speaking this name is applicable to any instrument, such as a mural circle, a theodolite, and so on, used for measuring an angle; it is in reality, however, applied exclusively to instruments used for measuring the angles between the faces of crystals. (See SPECTROSCOPE.)

GONSALVO. See GONZALO.

GONZAGA, or GONZUGUE, an old princely family of Italy, which traces its origin to the emperor Lothair, but first came into notice in the eleventh century, after the overthrow of the imperial power in Italy, where they for some time disputed the sovereignty of Mantua with the Bonacosse. The long dispute was ended by the murder of Passerino de Bonacossi in 1328, after which the Gonzaga retained possession of Mantua for four centuries.

GONZAGA, THOMAZ ANTONIO (809), "the Portuguese Petrarch," perhaps better known as DIRCEU, was born at Oporto in 1744, and died in 1809.

GONZALO DE BERCEO, mystic and didactic poet, and one of the earliest names in Castilian literature, was parish priest at Berceo, near San Domingo de la Calzada, in the province of Burgos, and lived, it is believed, during the first sixty years of the Thirteenth century.

GONZALO FERNANDEZ Y AGUILAR, commonly known as Gonsalvo de Cordova, El Gran Capitán ("The Great Captain"), was born at Montilla on March 16, 1453, and died in 1515.



GOOD, JOHN MASON, a writer on medical, religious, and classical subjects, was born May 25, 1764, at Ep-ping, Essex, and died January 2, 1827.

GOOD FRIDAY, the usual English name for the day observed throughout a great part of Christendom as the anniversary of the passion and death of Christ.

The origin of the custom of a yearly commemoration of the crucifixion is involved in some obscurity. It may be regarded as certain, indeed, that among Jewish Christians it almost imperceptibly grew out of the old habit of annually celebrating the Passover on the 14th of Nisan, and of observing the "days of unleavened bread," from the 15th to the 21st of that month. In the Gentile churches, on the other hand, it seems to be well established that originally no yearly cycle of festivals was known at all. The weekly observance of the dies dominica, however, became universal at a very early date; and the practice of giving special prominence to Easter Sunday (the first Sunday after the 14th of Nisan), as well as that of keeping a previous fast of considerable rigor, though of indeterminate duration, had established itself in Egypt and in the Western churches at least by the middle of the second century.

From the earliest period of its observance, the day was marked by a specially rigorous fast, and also, on the whole, by a tendency to greater simplicity in the public services of the church.

GOODRICH, SAMUEL GRISWOLD, an American author better known under the pseudonym of Peter Par-ley, was the son of a Congregational minister, and was born at Ridgefield, Connecticut, August 19, 1793. He was a prolific writer. He died in 1860.

GOODSIR, JOHN, anatomist, born at Anstruther, Fife, Scotland, March 20, 1814; died in 1867.

GOODWIN, THOMAS, a prominent English divine of the later Puritan period, was born at Rollesby, Norfolk, on October 5, 1600, and died in 1679.

GOOJERAT. See GUJARAT.

GOOLE, a market town and river-port of England, West Riding of Yorkshire, is situated on the right bank of the Ouse, twenty-five miles west of Hull, on the Hull and Doncaster Railway, and at the eastern terminus of the Wakefield, Pontefract, and Goole branch of the Lancashire and Yorkshire Railway.

GOOSANDER. See MERGANSER.

GOOSE, the general English name for a considerable number of birds, belonging to the Family *Anatidæ* of modern ornithologists, which are mostly larger than Ducks and less than Swans. Technically the word Goose is reserved for the female, the male being called Gander.

The most important species of Goose, and the type of the genus *Anser*, is undoubtedly that which is the origin of our well-known domestic race, the *Anser ferus* or *A. cinereus* of most naturalists, commonly called in English the Gray or Gray Lag Goose, a bird of exceedingly wide range in the Old World, apparently breeding where suitable localities are to be found in most European countries from Lapland to Spain and Bulgaria. Eastward it extends to China, but does not seem to be known in Japan. The domestication of this species, as Mr. Darwin remarks, is doubtless of very ancient date, and yet scarcely any other animal that has been tamed for so long a period, and bred so largely in captivity, has varied so little. It has increased greatly in size and fecundity, but almost the only change in plumage is that tame Geese lose the browner and darker tints of the wild bird, and are invariably more or less marked with white — being often indeed wholly of that color. The most generally recognized breeds of domestic Geese are those to which the distinctive names of Emden and Toulouse are applied; but a singular breed,

said to have come from Sebastopol, was introduced into Western Europe about the year 1856. In this the scapulars are elongated, curled and spirally twisted, having their shaft transparent, and so thin that it often splits into fine filaments, which, remaining free for an inch or more, often coalesce again.

In North America there is only one species of typical Goose, and that belongs to the white-“nailed” group. It very nearly resembles *A. albifrons*, but is larger, and has been described as distinct under the name of *A. gambeli*.

But the New World possesses by far the greatest wealth of Anserine forms. Besides others, presently to be mentioned, its northern portions are the home of all the species of Snow-Geese belonging to the genus *Chen*. It is true that two of these are reported as having appeared, and that not unfrequently, in Europe and Asia; but they possibly have been but stragglers from America. The first of these, the Snow-Goose proper, is a bird of large size, and when adult of a pure white, except the primaries, which are black.

The southern portions of the New World are inhabited by about half a dozen species of Geese, akin to the foregoing, but separated as the genus *Chloephaga*. The most noticeable of them are the Rock or Kelp Goose, and the Upland Goose. In both of these the sexes are totally unlike in color, the male being nearly white, while the female is of a mottled brown, but in others a greater similarity obtains. Very nearly allied to the birds of this group, if, indeed, that can be justifiably separated, comes one which belongs to the northern hemisphere, and is common to the Old World as well as the New. It contains the Geese which have received the common names of Bernacles or Brents, and the scientific appellations of *Bernicla* and *Branta* — for the use of either of which much may be said by nomenclaturists. All the species of this section are distinguished by their general dark, sooty color, relieved in some by white of greater or less purity, and, by way of distinction from the members of the genus *Anser*, which are known as Gray Geese, are frequently called by fowlers Black Geese. Of these, the best known, both in Europe and North America, is the Brent-Goose, a truly marine bird, seldom (in Europe, at least), quitting salt-water. It is known to breed in Spitsbergen and in Greenland. A form which is, by some ornithologists, deemed a good species, and called by them *B. nigricans*, occurs chiefly on the Pacific coast of North America. In it the black of the neck, which, in the common Brent, terminates just above the breast, extends over most of the lower parts. The true Bernacle-Goose is but a casual visitor to North America, but is said to breed in Iceland, and occasionally in Norway. Its usual breeding-places, however, still form one of the puzzles of the ornithologist, and the difficulty is not lessened by the fact that it will breed freely in semi-captivity, while the Brent-Goose will not. From the latter the Bernacle-Goose is easily distinguished by its larger size and white cheeks. Hutchins' Goose seems to be its true representative in the New World. In this the face is dark, but a white crescentic or triangular patch extends from the throat on either side upward behind the eye. Almost exactly similar in coloration to the last, but greatly superior in size, and possessing eighteen rectrices, while all the foregoing have but sixteen, is the common wild Goose of America, which, for some two centuries or more, has been introduced into Europe, where it propagates so freely that it has been included by nearly all the ornithologists of this quarter of the globe, as a member of its fauna. An allied form, by some deemed a species, is *B. leucopareia*, which ranges over the western part of North America, and, though



having eighteen rectrices, is distinguished by a white collar round the lower part of the neck.

The largest living Goose is that called the Chinese, Guinea, or Swan-Goose, and it seems to be the stock whence the domestic Geese of several Eastern countries have sprung. It may not unfrequently be seen in English farmyards, and it is found to cross readily with our common tame Goose, the offspring being fertile, and Blyth has said that these crosses are very abundant in India. The true home of the species is in Eastern Siberia or Mongolia.

GOOSEBERRY, *Ribes grossularia*, a well-known fruit-bush of northern and central Europe, usually placed in the same genus of the natural order to which it gives name as the closely allied currants, but by some made the type of a small sub-genus, *Grossularia*, the members of which differ from the true currants chiefly in their spinous stems, and in their flowers growing on short footstalks, solitary, or two or three together, instead of in racemes.

The wild gooseberry is a small, straggling bush, nearly resembling the cultivated plant—the branches being thickly set with sharp spines, standing out singly or in diverging tufts of two or three from the bases of the short spurs or lateral leaf shoots, on which the bell-shaped flowers are produced, singly or in pairs, from the groups of rounded, deeply-crenated three or five lobed leaves. The fruit is smaller than in the garden kinds, but is often of good flavor; it is generally hairy, but in one variety smooth, constituting the *R. uva-crispa* of writers; the color is usually green, but plants are occasionally met with having deep purple berries.

The varieties are most easily propagated by cuttings planted in the autumn, which root rapidly, and in a few years form good fruit-bearing bushes. Much difference of opinion prevails regarding the mode of pruning this valuable shrub; it is probable that in different situations it may require varying treatment. The fruit being borne on the lateral spurs, and on the shoots of the last year, it is the usual practice to shorten the side branches in the winter, before the buds begin to expand; some reduce the longer leading shoots at the same time, while others prefer to nip off the ends of these in the summer while they are still succulent. When large fruit is desired, plenty of manure should be supplied to the roots, and the greater portion of the berries picked off while still small.

The gooseberry was introduced into the United States by the early settlers, and in some parts of New England large quantities of the green fruit are produced and sold for culinary use in the towns; but the excessive heat of the American summer is not adapted for the healthy maturation of the berries, especially of the English varieties. Perhaps if some of these, or those raised in the country, could be crossed with one of the indigenous species, kinds might be obtained better fitted for American conditions of culture, although the gooseberry does not readily hybridize. The bushes are apt to be infested by a minute fly, known as the gooseberry midge, which lays its eggs in the green fruit, in which the larvæ are hatched, causing the berries to turn purple, and fall prematurely.

The gooseberry, when ripe, yields a fine wine by the fermentation of the juice with water and sugar, the resulting sparkling liquor retaining much of the flavor of the fruit. By similarly treating the juice of the green fruit, picked just before it ripens, an effervescing wine is produced, nearly resembling some kinds of champagne, and, when skillfully prepared, far superior to much of the liquor sold under that name. Brandy has been made from ripe gooseberries by distillation; by exposing the

juice with sugar to the acetous fermentation a good vinegar may be obtained. The gooseberry, when perfectly ripe, contains a large quantity of sugar, most abundant in the red and amber varieties; in the former it amounts to from 6 to upward of 8 per cent. The acidity of the fruit is chiefly due to malic acid.

GOPHER (*Testudo gopher*, Bartr.), the only living representative on the North American continent of the family of land tortoises, where it occurs in the south-eastern parts of the United States, from Florida in the south to the river Savannah in the north. Its carapace, which is oblong and remarkably compressed, measures from thirteen to fourteen inches in extreme length, the shields which cover it being grooved, and of a yellow-brown color. The gopher abounds chiefly in the forests, but occasionally visits the open plains, where it does great damage, especially to the potato crops, on which it feeds. It is a nocturnal animal, remaining concealed by day in its deep burrow, and coming forth at night to feed. Its strength, in proportion to its size, is said to be enormous, it being able, according to Dumeril and Bibron, to move along comfortably bearing a man on its back. The flesh of the gopher or mungofa, as it also called, is considered excellent eating.

GÖPPINGEN, a town of Würtemberg, circle of the Danube, on the right bank of the Fils, twenty-two miles east-southeast of Stuttgart.

GORAKHPUR, a district of the Northwestern Provinces, India, bounded on the north by the territory of Nepál, on the east by Champáran and Sárán, on the south by the Gogra river, and on the west by Basti and Fyzabad, with an area of 4,578 square miles. The district lies immediately south of the lower Himálayan slopes, but forms itself a portion of the great alluvial plain.

GORAKHPUR, a municipal city, and the administrative headquarters of Gorakhpur district, Northwestern Provinces, on the river Rápti, near the center of the district.

GORAMY, or GOURAMY (*Osphronemus olfax*), is reputed to be one of the best-flavored freshwater fishes in the East Indian archipelago. Its original home is Java, Sumatra, Borneo, and several other East Indian islands, but thence it has been transported to and acclimatized in Penang, Malacca, Mauritius, and even Cayenne. Being an almost omnivorous fish and tenacious of life, it seems to recommend itself particularly for acclimatization in other tropical countries; and specimens kept in captivity become as tame as carps. It attains the size of a large turbot. Its shape is flat and short, the body covered with large scales; the dorsal and anal fins are provided with numerous spines, and the ventral fins produced into long filaments.

GORCUM, or GORKUM (Dutch, *Gorinchem*), a town of the Netherlands, chief town of a circle in the province of South Holland, twenty-two miles east-southeast of Rotterdam, on the right bank of the Merve or Merwede, at the influx of the Linge, by which it is intersected.

GORDIANUS, or GORDIAN, the name of three Roman emperors. The first, Marcus Antonius Africanus Gordianus, the wealthiest of the Romans, was descended on the father's side from the Gracchi, on the mother's from Trajan, while his wife was the granddaughter of Antonius Pius. While he gained unbounded popularity by his magnificent games and shows, his prudent and retired life did not alarm the tyranny of Caracalla. Alexander Severus called him to the dangerous honors of government in Africa, and, during his proconsulship there, occurred the usurpation of Maximin. The universal discontent roused by the oppressive rule of Maximin culminated in a revolt in Africa in 238, and Gordian reluctantly yielded to the popular clamor and



assumed the purple. His son was associated with him in the dignity. The senate confirmed the choice of the Africans, and most of the provinces gladly sided with the new emperors; but, even while their cause was so successful abroad, they had fallen before the sudden inroad of Capellianus, who commanded Mauretania in the interest of Maximin. They had reigned only thirty-six days. Both the Gordians had deserved, by their amiable character, their high reputation; they were men of great accomplishments, fond of literature, and voluminous authors; but they were rather intellectual voluptuaries than able statesman or powerful rulers. Having embraced the cause of Gordian, the senate was obliged to continue the revolt against Maximin, and appointed Maximus and Balbinus, two of its noblest and most esteemed members, as joint emperors. At their inauguration a sedition arose, and the popular outcry for a Gordian was appeased by the association of M. Antonius Gordianus Pius, nephew of the younger and grandson of the elder Gordian, a boy of thirteen. Maximin forthwith invaded Italy, but was murdered by his own troops while besieging Aquileia; and a revolt of the prætorian guards, to which Maximus and Balbinus fell victims, left Gordian sole emperor. He was slain by his soldiers in 244.

**GORDIAN KNOT.** The origin of this famous knot was as follows: Gordius, a Phrygian peasant, was once plowing in his fields, when an eagle settled on his yoke of oxen, and remained till the end of the day. A prophetess of Telmissus advised him to sacrifice to Zeus. He did so, and out of gratitude married the prophetess, by whom he had a son, Midas. When Midas grew up, disturbances broke out in Phrygia, and the people sent messengers to Delphi, to ask about choosing a new king. The messengers were informed that a king would come to them riding on a car, and that he would restore peace. Gordius, with his father, very opportunely arrived in the requisite manner. He was elected king, whereupon he dedicated his car and yoke to Zeus, in the acropolis, the knot of the yoke being tied in so skillful a manner, that an oracle declared whoever should unloose it would be ruler of all Asia. When Alexander the Great came, he cut the knot with his sword.

**GORDIUM**, an ancient town of Bithynia, was situated not far from the River Sangarius, but the site has not been exactly ascertained, though M. Lejean believes that it may be identified with ruins which he observed in the vicinity of the village Enret. According to the legend, Gordium was founded by a certain Gordius, who had been called to the throne by the Phrygians in obedience to an oracle of Zeus commanding them to select the first person that rode into the agora in a car. Gordius reigned many years and raised Phrygia to an important position.

**GORDON, ALEXANDER**, the "Sandy Gordon" of Scott's *Antiquary*, is believed to have been a native of Aberdeen, and a graduate of either King's or Marischal College, but of his parentage and early history nothing is known. When still a young man he is said to have traveled abroad, probably in the capacity of tutor. He must, however, have returned to Scotland previous to 1726, when, betaking himself to antiquarian pursuits, he made the acquaintance of, among others, Roger Gale, the first vice-president of the Society of Antiquaries. In the year just mentioned appeared the *Itinerarium Septentrionale*, his greatest and best known work.

**GORDON, LORD GEORGE**, third and youngest son of Cosmo George, duke of Gordon, was born in London, 1751. After completing his education at Eton, he entered the navy, where he rose to the rank of lieutenant; but on account of a disagreement regarding promotion

with Lord Sandwith, then at the head of the admiralty, he resigned his commission shortly before the commencement of the American war. In 1774 he entered parliament as a member for the small borough of Luggershall, and possessing some wit, great ease of address, and the confidence arising from sincere conviction, he advocated his individual notions on any subject with great volubility and with something of the eagerness of monomania. After supporting the ministry for some time, he began to attack both ministry and opposition with such ceaseless pertinacity that it became a common saying that "there were three parties in parliament—the ministry, the opposition, and Lord George Gordon." He vehemently opposed the passing of the acts for the removal of the Roman Catholic disabilities, and took a leading part in organizing the Protestant associations of Scotland and England. Of both associations he was chosen president, and, on June 2, 1780, he headed the mob which marched in procession from St. George's Fields to the houses of parliament in order to present the monster petition against the acts. After the mob reached Westminster, a terrific riot ensued, which continued several days, during which the city was virtually at their mercy. At first, indeed, they dispersed after threatening to make forcible entry into the house of commons, but reassembled soon afterward and destroyed several Roman Catholic chapels, pillaged the private dwellings of many Roman Catholics, set fire to Newgate and broke open all the other prisons, attacked the Bank of England and several other public buildings, and continued the work of violence and conflagration until the interference of the military, by whom no fewer than 450 persons were killed and wounded before the riots were quelled. For his share in instigating the riots, Lord Gordon was apprehended on a charge of high treason; but, mainly through the skillful and eloquent defense of Erskine, he was acquitted on the ground that he had no treasonable intentions. In 1786 he was excommunicated by the archbishop of Canterbury for refusing to bear witness in an ecclesiastical suit; and, in 1787, he was convicted of libeling the queen of France, the French ambassador, and the administration of justice in England. He was however, permitted to withdraw from the court without bail, and made his escape to Holland; but on account of representations from the court of Versailles he was commanded to quit that country, and, returning to England, was apprehended, and, in January, 1788, was sentenced to five years' imprisonment in Newgate, where, after refusing to grant the guarantees required as a condition of his obtaining his liberty, at the conclusion of his original term of imprisonment, he died of delirious fever in 1793. Some time before his apprehension he had become a convert to Judaism, and had undergone the initiatory rite.

**GORDON, SIR JOHN WATSON**, Scottish painter, was born in Edinburgh in 1788 and died in 1864.

John Watson Gordon was one of the earlier members of the Royal Scottish Academy and was elected its president in 1850; he was at the same time appointed limner to her majesty for Scotland, and received the honor of knighthood. Since 1841 he had been an associate of the Royal Academy, and in 1851 he was elected a Royal Academician. Sir John continued to paint with little if any diminution of power until within a very few weeks of his death, which occurred on June 1, 1864.

**GORDON, PATRICK**, of Auchleuchries, a Russian general, was descended from a Scotch family of Aberdeenshire. He was born in 1635, and died November 29, 1699. The czar, who had made him general-in-chief of the Russian army, visited him frequently during his illness, was with him when he died, and with his own hands closed his eyes.



GORE, MRS. CATHERINE GRACE, an exceedingly prolific English novelist, was born in 1799 at East Retford, Nottinghamshire, and died in 1861.

GOREE (in French *Gorée*, and in the native tongue *Bir* or *Berr*, that is, a belly, in allusion to its shape), a small island off the west coast of Africa, belonging to the French colony of the Senegal. Goree is a free port, and forms a convenient center for the distribution of European goods.

GORGIIAS of Leontini, in Sicily, a rhetorician and sophist of whose personal history nothing is known beyond the facts that in 427, when already a comparatively old man, he was sent by his fellow-citizens at the head of an embassy to ask Athenian protection against the aggression of the Syracusans; that he then settled in Athens, and supported himself by the practice of oratory and by teaching rhetoric; and that he ended his days at Larissa, in Thessaly. His birth and death may be approximately dated respectively at 483 and 375 B.C.

GORGON. In Grecian mythology, Gorgo is always the impersonation of the atmospheric terrors, and is conceived in connection with the deities that are armed with thunder and lightning — Zeus and Athene. With Athene in particular is the connection very close, and some facts of ritual and nomenclature almost suggest an original identity of the two.

GORI, in Georgia, an ancient fortress, is now the chief town of a district of the same name in the government of Tiflis, and a station on the Poti-Tiflis railroad.

GORILLA. See APE.

GÖRITZ. See GÖRZ.

GÖRLITZ, a town in the Prussian province of Silesia, capital of a circle in the government district of Liegnitz, is situated on the left bank of the Neisse, and at the junction point of several railways, fifty-five miles east of Dresden. Population (1890), 56,460.

GÖRRES, JOSEPH JOHANN, a distinguished controversialist and writer on religious, political, and scientific subjects, was born January 25, 1776, at Coblentz, and died in 1848.

GORTSCHAKOFF (GORCHAKOV), a noble Russian family, descended from Michael Vsevolodovich, prince of Chernigoff, who, in 1246, was assassinated by the Mongols. Several members of this family have in recent years taken prominent parts in the military, political, and social events of the Russian empire. (See Vol. X.)

GORTYNA, or GORTYN, an important ancient city on the southern side of the island of Crete. It was, next to Cnossus, the largest and most powerful city of Crete. The two cities combined to subdue the rest of the island; but when they had gained their object, they quarreled with each other, and the history of both towns is from this time little more than a record of their feuds.

GÖRZ, with GRADISCA, is one of the crown-lands of the Austrian monarchy, bounded north by Carinthia, east by Carniola, Istria and the Triestine territory, south by the Triestine territory and the Adriatic and west by Italy. On all sides, except toward the southwest where it unites with the Friulian lowland, it is surrounded by mountains, and four-sixths at least of its area of 3,075 square miles is occupied by mountains and hills. From the ridge of the Julian Alps, which rise in an almost unbroken line to a height of 6,000 or 7,000 feet, the country descends in successive terraces toward the sea, and may roughly be divided into the upper highlands, the lower highlands, the hilly district, and the lowlands. Population, 647,943.

GORZ, GORTZ, or GORIZ, the chief town of the crown land, is beautifully situated in the fruitful valley of the Isonzo, twenty-five miles north-northwest of Trieste by railway. It is the seat of an archbishop, of a circle court, and of a head tax office. Population, 23,000.

GOS-HAWK, *i.e.* Goose Hawk, the *Astur palumbarius* of ornithologists, and the largest of the short-winged Hawks used in Falconry. Its English name, however, has possibly been transferred to this species from one of the long-winged Hawks, or true Falcons, since there is no tradition of the Gos-Hawk, now so called, having ever been used in Europe to take Geese or other large and powerful birds. The genus *Astur* may be readily distinguished from *Falco* by the smooth edges of its beak, its short wings (not reaching beyond about the middle of the tail), and its long legs and toes — though these last are stout and comparatively shorter than in the Sparrow-Hawks. In plumage the Gos-Hawk has a general resemblance to the Peregrine Falcon (see FALCON), and it undergoes a corresponding change as it advances from youth to maturity — the young being longitudinally streaked beneath, while the adults are transversely barred. The irides, however, are always yellow, or in old birds orange, while those of the Falcons are dark brown. The sexes differ greatly in size.

GOSHEN (גֹּשֶׁן), or the land of Goshen, a territory of Egypt in which the Israelites were settled from Jacob's immigration to the Exodus. In the Septuagint the equivalent is usually the land Gesem, but in Gen. xiv. 10 "the land Gesem of Arabia," Arabia being here either the Arabian nome or the extreme east of Lower Egypt.

GOSHEN, Orange County, N. Y., is the capital of the county, and is situated in the midst of a rich dairy region. It is noted for its trade in butter and dairy products. It has cheese and other manufactories, railroad and telegraph facilities, banks, churches, etc., and a population of (1890) 3,500.

GOSHEN, the county seat of Elkhart County, Ind., is a railroad center of some importance. Its water power is utilized in extensive manufactories of various kinds. It has good banking, telegraph and educational facilities. Its population numbers (1890), 6,027.

GOSLAR, a town in the district of Hildesheim, Prussia, province of Hanover, is situated on the Gose, an affluent of the Ocker, at the foot of the Harz, twenty-four miles southeast of Hildesheim. It is surrounded by walls, and has a very antique appearance.

GOSLICKI, WAWRZYNIEC, a learned Pole, better known under his Latinized name of Laurentius Grimalius Goslicius, was born about 1533. He was also a strenuous advocate of religious toleration in Poland. He died October 31, 1607.

GOSPELS, SYNOPTICAL GOSPELS, of the four canonical Gospels (*god*, God or good; *spell*, discourse or tidings). The first three (differing from the fourth) agree in narrating nearly the same events in somewhat similar language, and are hence called synoptical. It will be advantageous to begin with the treatment of these, as to their origin, date, and objects, so far as can be determined from (1) internal evidence and (2) external evidence.

#### *Internal Evidence.*

In discussing the internal evidence, it will be convenient to speak, first, of those portions of the synoptic narrative which are found in three Gospels; then of those which are found in only two; and, lastly, of those which are found in only one.

*The Triple Tradition.*—Few are aware of the very small extent to which independent narrators of the same events use the same words. A comparison of a few specimens of independent narratives (of such events, for example, as the attempt to assassinate King Humbert, or the death of the French Prince Imperial) would show



that the narratives often contain scarcely two or three consecutive words in common, and rarely or never a whole clause of five or six words. The same statement applies to narratives of discourses of any length reported from memory, and not from notes taken at the moment. Now it is well known that in many parts of the first three gospels the same words and phrases are curiously interlaced, in such a way as to suggest that the writers have borrowed either from each other or from some common source. For example, in describing the healing of the sick (Matt. viii. 16; Mark i. 32; Luke iv. 40), Matthew begins thus; *ὁψίας δὲ γενομένης* (*opsías dè genoménēs*), when the evening was come; Mark, *ὁψίας δὲ γενομένης ὅτε ἔδυσεν ὁ ἥλιος* (*opsías dè genoménēs hôte édysen ho hélios*), and at evening, when the sun had set; Luke, *δύνοντος δὲ τοῦ ἡλίου* (*dynontos dè tou hēliou*), when the sun was setting. From this and many similar passages it might seem natural to infer that Mark borrowed one of these expressions from Matthew and the other from Luke, and that the narrative of Mark is little more than a combination of passages from Matthew and Luke. This is an inference which has actually been drawn by many critics both before and since De Wette; but at present it finds comparatively little support among competent investigators. However, the oscillations of New Testament criticism have been so numerous that it may be of use to indicate a method by which the originality of Mark may be established on an immovable basis. That Mark (at all events in many parts) contains the original document or tradition from which Matthew and Luke have borrowed can be proved to demonstration by a necessary inference from a specimen of narrative common to the three writers. (See Matt. xxi, 33-44; Luke xx. 9-18; Mark xii. 1-11.)

It will be observed in the extracts referred to, that (up to verse eleven of Mark), besides the matter common to all three writers, Mark and Luke have a good deal of additional matter in common; Mark and Matthew have also much additional matter in common; but, in striking contrast, Matthew and Luke have no additional matter in common, except that in verse three of Mark they insert *οἱ γεωργοί* for clearness; in verse seven they insert *ἰδόντες*; and in verse nine they insert *οὖν*. Are these facts compatible with the theory that Mark compounded his narrative out of Matthew and Luke?

We may begin by dismissing the three trifling words which Matthew and Luke agree in adding to the Triple Tradition (by which we mean the matter common to the three Gospels), as being words that any early editor of Mark might naturally insert. The insertion of the subject in verse three, for clearness, requires no comment. The *οὖν* in verse nine softens an abruptness which (however characteristic of Mark) would naturally repel readers and editors. Again, in verse seven the omission of some phrase to denote that the husbandmen saw the son approaching before they formed their plan, is so abrupt that *ἰδόντες* or *θεασάμενοι* has been actually supplied in Mark by several manuscripts and versions (possibly, of course, influenced by Matthew and Luke), and might naturally be supplied by still earlier editors. Having therefore accounted for these words, we are led to this result, that, from Mark xii. 1 to Mark xii. 11, Matthew and Luke contain nothing in common which is not also found in a slightly modified edition of Mark. This being the case, it can be proved by *reductio ad absurdum* that Mark did not copy from Matthew and Luke. For suppose that he did so copy, it follows that he must not only have constructed a narrative based upon two others, borrowing here a piece from Matthew and here a piece from Luke, but that he must

have deliberately determined to insert, and must have adapted his narrative so as to insert, every word that was common to Matthew and Luke. The difficulty of doing this is enormous, and will be patent to any one who will try to perform a similar literary feat himself. To embody the whole of even one document in a narrative of one's own, without copying it *verbatim*, and to do this in a free and natural manner, requires no little care. But to take two documents, to put them side by side and analyze their common matter, and then to write a narrative, graphic, abrupt, and in all respects the opposite of artificial, which shall contain every phrase and word that is common to both—this would be a *tour de force* even for a skillful literary forger of these days, and may be dismissed as an impossibility for the writer of the Second Gospel.

The question remains, Were Matthew and Luke entirely dependent upon Mark for that part of their narrative which covers the same ground as Mark? It would not be difficult, from a comparison of the three citations above, to make it probable that Matthew and Luke did not borrow from the complete Mark as we have it. For though each of the three additions *οὖν*, *ἰδόντες*, *οἱ γεωργοί* is in itself natural enough, yet the hypothesis that Matthew and Luke independently adopted precisely these and no other additions is most improbable. From a comparison of many such passages the improbability of the borrowing hypothesis might be increased.

What then was the original tradition upon which our three synoptic Gospels are based? Was it Aramaic or Greek? oral or written? single or manifold? Did the earliest of our synoptists receive it fresh from its first source, or after it had passed through many recensions? Few or none of these questions (to some of which reference will be made hereafter) can be answered with absolute certainty; but it is evident that, if Matthew, Mark, and Luke are all based upon an earlier original tradition, then those words and phrases which are common to Matthew, Mark, and Luke (to which we have given the name of the Triple Tradition) must have a peculiar weight, as approximating to the original tradition itself. If it be found that these scattered words and phrases make up of themselves an almost continuous narrative, we may fairly suppose that we are approximating very closely indeed to the original tradition. We shall not expect to find a perfectly continuous narrative. On the contrary, a perfectly continuous narrative, identical in Matthew, Mark, and Luke, would imply, not a floating early variable tradition but a document simply copied by the authors of our Gospels.

An early tradition, circulated perhaps in various churches, in Antioch, in Rome, in Ephesus, in Corinth, before being embodied in a document, will naturally have been modified, supplemented, and sometimes (as above) confused. More especially in certain unimportant and constantly recurring words and phrases we may expect variations. The words "said," "answered," "went," "journeyed," "asked," "questioned," "tempted," "refused," "rebuked," etc., may naturally be expected to differ in the three versions. But greater differences will soon arise. One version will lay greater stress on the details of miracles; another on the relations between Jesus and John the Baptist; another on the law; another on the forgiveness of sins; and this varying emphasis will produce certain modifications of the original traditions. Again, in the early times of the church, the Greek of slaves and freedmen may pass without offense; but in later times an editor of the Gospel, writing for readers of higher rank and better education, will substitute less uncouth words for the original barbarisms. Thus, from varying causes, the



different versions of the tradition will deviate; and when we come to compare three of them together, and to write down the words common to the three, we shall no longer find the original continuous tradition. Gaps in the sense will occur every now and then, owing to the omission of some necessary word. On the other hand, although the literary cement (so to speak) which fills up the interstices between the words and deeds of the Lord may naturally vary, we may expect that the words of the Lord himself will be more carefully preserved, and more identically reported by all three synoptists, so that they will give a more continuous sense, and will enable us to approximate to the original tradition. Let us now take the Gospel of Mark, and set down, from the first two chapters of it, all such words as it contains in common with Matthew and Luke, merely adding in italics such words as may enable the reader to perceive the structure of each sentence; and let us see whether the words thus collected show any traces of a continuous narrative:—

“Esaias | the prophet: || the voice of one crying in the wilderness, Prepare the way of the Lord, make His paths straight. | John | in the wilderness preaching | repen(t). | All | wen(t) forth | *to be baptiz(ed) by him.* || There cometh one stronger than I | whose shoe-latchet [Mat. shoes] | I am not worthy to loose [Mat. bear]. | I baptiz(e) you with water, He | shall baptize you with the Holy Spirit. || Jesu(s) *was* bapti(zed). || The heaven | and the Spirit, as a dove, descend(ing) on Him. And a voic(e) from | heaven | My beloved Son, in Thee [Mat. whom] I am well pleased. | The Spirit *drives Him*; | in the wildern(ess) forty days tempt(ed) by [Satan; Lu. devil]. || *He came* into Galilee. || Com(eth) into the house of Simon [Mat. Peter]. | Step-mother *sick of* a fever. || And the feve(r) left her; | she ministered to the(m). || He *heale(d)*. || He *preache(d)* in the synagogu(es) of Galil(ee). || *There came* a leper | saying to Hi(m), If Thou wilt, Thou canst make me clean. And stretching forth His hand, He touched him | I will, be thou clean. And immediately *there departed* from him the leprosy. || And *He said* to him, Tel(l) no one, but | show thyself to the priest, and offer *that which* Moses ordained as a testimony to them.” Chap. ii. “|| And they brin(g) Hi(m) a paralyti(c). || And seeing their faith, || *He said*, Thy sins are forgive(n). | The scribes *said*, This man blasphem(eth). || Jesus said to the(m), | Why *reason ye* in your hearts? Which is easier, to say | Thy sins are forgive(n), or to say, Ris(e) | and walk? But that ye may know that the Son of Man hath power on earth to forgive sins, He *saieth* to the paralyti(c), | Rise, take thy *bed*, | go to thy house. And | having taken it up, he went. || And they glorifi(ed) God. And *He saw* one sitting at the receipt of custom, and *said* to him, Follow Me, | and arising he followe(d) Him. | And he *feasted* Him in his house, and man(y) publican(s) | were feast(ing). || And the Pharisee(s) sai(d) to His disciple(s), W(hy) eat with publicans and sinners? | H(e) | *said* to them, They that are strong [Lu. healthy] have no need of a physician, but they that are sick. I cam(e) not to call the righteous but sinners. | The disciples of John | say to Hi(m): | *The disciples of John and of the Pharisee(s) fas(t), but Thin(e) do not.* Jesus said to the(m), Ca(n) the son(s) of the bride-chamber *fast*? | the bridegroom is with them. || But the days shall come when the bridegroom shall be taken from them. Then shall they fast. | No one putteth on a | patch upon an ol(d) garment. No on(e) putte(th) new wine into old bottles. Else, it will burs(t) the bottle(s) and the wine will peris(h) and the bottles also. But new wine into new bottles. || *On the Sabbath they were* going through corn-fields; His disciples plucke(d) the wheat-ears. |

The Pharisee(s) *said*, *They* are doin(g) on the Sabbat(h) that which is not lawful. *He said* to the(m), Have ye not read *what* David did when he was an hungered, and they that were with him? how he went into the house of God, | and ate the shewbread, whic(h) it is not law(ful) to eat, save for the priest(s)? || The Son of Man is Lord of the Sabbath.”

Few will have any difficulty in following the above narrative which represents the Triple Tradition of the synoptists. It will be generally admitted that, so far as it extends, it omits little of importance; and its continuity will commend it as likely to be, if not the original tradition, at all events a closer approximation to it than we are likely to find elsewhere. It therefore becomes an important business to consider the scope and variations of the Triple Tradition,—where it is full and ample, where it is meager, where it begins and where it ends.

The commencement of the Triple Tradition has been given in the specimen quoted above. It begins with the proclamation made by John the Baptist, of the advent of the Stronger One. Describing (Mk. iii.) the cure of the withered hand, the choice of the Twelve, the discourse on blasphemy against the Holy Spirit, and the answer to the question, “Who is My mother and My brethren?” it passes (chap. iv.) to the parables of the sower and the mustard seed, which it gives very fully; the rebuking of the wind and the exorcism of the legion (Mk. v.) are given as follows:—

Mk. iv. 35. “*Let us go across* to the other side. *They took* Hi(m) | *in* a boat. || They wak(e) Hi(m) say(ing), We perish: and He, arising, rebuked the win(d). || And there was a calm. *He said* to them, | Your faith! || They said, *Who* is this that even the wind obey(eth) Him?” Mk. v. 1. “And they *came* across into the land of the [Gadarenes, Gerasenes, or Gergesenes]. There met Him | *one* [Mat. two] in the || tombs || crying, | What is there *between me* and Thee, Thou Son of God? || Torment *me not*. || And he [Mat. they] besought Him . . . into . . . || And He . . . them, | goin(g) forth, they come to (or into) the swine, and the herd rushed down the steep place into the sea [Lu. lake] and [were choked, Mat. perished]. | Those that were feeding them | fled and brought word into the city. || They came || Jesus. || And | *they besought* Him *to depart* from | them.”

This is given as a specimen of those passages where the narrative is not so continuous, and where there is some appearance of confusion. The evidence of confusion is confirmed (1) by the fact that a word is used here (*δαίμων*) to denote “spirit” or “demon,” which is not found once elsewhere in the whole of the Gospels, nor, indeed, anywhere in the New Testament (except in the Apocalypse twice), whereas *δαίμόνιον* is used forty-five times, and *πνεῦμα* twenty-seven times in the three Gospels alone; (2) by the difference of the names for the locality, Gadara, Gerasa, Gergesa; (3) by the fact that Matthew speaks of two demoniacs instead of one.

The restoring to life of the daughter of a ruler (Mk. and Lu., ruler of a synagogue) is next thus briefly related: “*He came* into the house. | *She* is not dead, but sleepeth. And they mocked Him. || Having taken *her* by the hand | Arise.” Then follow (chap. vi.) the mission of the twelve, Herod’s conjecture about the new prophet, and the feeding of the five thousand.

The walking on the waves is much more briefly recorded (Mk. vi. 46–51). “*He went* to the mountain. | *It was* late. || *They see Him* walking on the sea. || It is I; be not afraid.” Then follows a blank, in which Matthew and Mark generally agree, while Luke



is altogether wanting; and, after this, the famous confession of Peter, followed closely by the transfiguration.

From Mark ix. 14 to x. 16 there is a break in the common tradition, which here records little except three or four sayings of the Lord.

In contrast to this discontinuity, Mark x. 17-52 gives a continuous tradition about the rich young man, the promise of reward to the disciples, the predictions of betrayal, and the healing of the blind man near Jericho. The entry into Jerusalem and the purification of the temple (xi. 1-17) are also fairly continuous. The disputes in the temple touching the baptism of John (xi. 27-33), the wicked husbandmen (xii. 1-12), and the tribute money (xii. 13-17) are very continuous. A brief denunciation of the Pharisees, who love the first seats in synagogues and at feasts, is found in Mark xii. 38-40. The Triple Tradition then touches on the second coming of Christ. Luke has here omitted many important passages which are recorded by Matthew and Mark alone.

In Matthew and Mark there follows the avowal that "of that day or hour none knoweth, not even the angels in heaven, nor even the Son, but only the Father." But Luke omits this. The Triple Tradition passes to the betrayal of Jesus. The traitor's compact (Mk. xiv. 10, 11) and the visit to the city to eat the Passover are briefly narrated. From this point the Triple Tradition becomes more and more scanty, till it leaves us at last little more than a few disconnected sayings of Jesus.

To sum up the contents of the common tradition, it omits the genealogies, miraculous incarnation, and the picturesque details of the infancy; it lays emphasis on the relations between John the Baptist and Jesus; it contains none of the parables except the sower, the mustard seed and the wicked husbandmen, and few of the long discourses of Jesus, except an abridged prediction of the second coming. The disputes between Jesus and the Pharisees about the Sabbath, about fasting, about exorcism, about the baptism of John, and the tribute, and Christ the Son of David, and the dialogue with the Sadducees about the resurrection, are very fully given; and so also is the dialogue with the rich young man. Indeed, it is a collection of dialogues and anecdotes rather than a set treatise of doctrine or biography. The sayings of Jesus recorded in it are short, pithy and abrupt, and many of them are polemical. Only now and then do we find a sentence which goes down deep below all polemics, and reveals a deep-laid spiritual plan. But, putting such sentences together, we perceive that the Triple Tradition describes a prophet wholly different from any that had before appeared in Israel; a prophet who not only (like Isaiah) protested against sabbaths and purifications as ends in themselves, but who also preached the Fatherhood of God in a manner entirely peculiar to Himself, and who set aside the Mosaic law of divorce. He also instructed his disciples to enter into the kingdom as little children (x. 15), and seemed to have attached a certain symbolic mystery to childhood as representing Himself. He taught His disciples further to devote their lives to Him, and to ignore all life apart from Him ("to confess Christ, to deny themselves"). From the first He claims the power of forgiving sins, and, as soon as one of His disciples confessed Him to be the Messiah, He prepared for death, predicting that He should die, but rise again. Then, after prophesying the fall of the temple, and great distress in all nations, He predicted a final triumph for his disciples, and, after bequeathing Himself, His body and His blood, as at a funeral feast, as His final legacy to His disciples, He was arrested and put to death.

Several miracles of healing are recorded, and, in addition to these, the exorcism of the Gadarene (in which, however, great confusion is apparent), the stilling of the

storm, the feeding of the five thousand, and the transfiguration. From the beginning of the discourse on the second coming, Luke diverges more and more from Matthew and Mark. After the death of Jesus, Matthew and Mark continue to agree in words and phrases, but a little confusion is apparent; and the tradition suddenly terminates without any record of the appearance of Jesus to His disciples. However we may regret this, it is perhaps what may be naturally expected on the hypothesis that we have before us an early tradition originated at a time when the numerous manifestations of Jesus after his death were still attested by living witnesses; when as yet it had been found impossible to reduce the experiences and impressions of those who had seen Him—impressions necessarily variable and transient, blended with fear and with an excitement bordering on ecstasy—to a consistent and historical shape; and when it had not yet been found necessary to define and harden the narrative so as to adapt it for the purpose of meeting doubts and objections.

*The Additions Common to Matthew and Mark.*—The additions to the Triple Tradition which are found in Matthew and Mark, but not in Luke, are the following:

(1) The description of John the Baptist (Mat. iii. 4; Mk. i. 6); (2) the ministering of the angels (Mat. iv. 11; Mk. i. 13); (3) the calling of the fishermen (Mat. iv. 18-22; Mk. i. 14-20); (4) the murmuring of His friends at Nazareth (Mat. xiii. 53-57; Mk. vi. 1-4); (5) the influence of Herodias in procuring John's execution (Mat. xiv. 8-13; Mk. vi. 25-29); (6) the walking on the water (Mat. xiv. 22-28; Mk. vi. 45-51); (7) the disputes with the scribes from Jerusalem (Mat. xv. 1-20; Mk. vii. 1-23); (8) the story of the Syro-Phoenician woman, which is narrated by Matthew and Mark in widely divergent language, but with an almost identical conclusion (Mat. xv. 21-28; Mk. vii. 24-30); (9) the feeding of the four thousand (Mat. xv. 32-38; Mk. viii. 1-9), and the comparison between this miracle and that of the five thousand (Mat. xvi. 5-12; Mk. viii. 14-21); (10) the saying of Jesus that Elias had already come (Mat. xvii. 12; Mk. ix. 13); (11) the discussion of the enactments of Moses concerning divorce (Mat. xix. 4-8; Mk. x. 2-9); (12) the saying (but Luke inserts it elsewhere) that "many that are first shall be last" (Mat. xix. 30; Mk. x. 31); (13) the petition of the sons of Zebedee for the chief places (Mat. xx. 20-28; Mk. x. 35-45); (14) the withering of the fig-tree (Mat. xxi. 18-22; Mk. xi. 13, 14, 20); (15) the introductory question of the lawyer, "Which is the great commandment" (Mat. xxii. 36; Mk. xii. 28); (16) in the discourse on the last day, Luke omits reference to the "consummation," *δυντελεια* (Mat.), *δυντελειῶθαι* (Mk.); "these things are the beginning of troubles;" "the abomination of desolation," etc.; "he that readeth let him understand;" "pray that your flight may not be in winter;" "(tribulation) such as was not from the beginning till now, nor ever shall be," the expression about the "shortening" of the days "for the elect's sake;" "He shall send His angels, and gather together the elect;" "of this hour the Son knoweth not;" (17) later on, Luke omits the anointing of Jesus "for His burial" (Mat. xxvi. 6-13; Mk. xiv. 3-9); (18) "I will smite the Shepherd," etc., and "I will go before you into Galilee" (Mat. xxvi. 31, 32; Mk. xiv. 27, 28); (19) the compact of Judas with the priests that a kiss should be the signal (Mat. xxvi. 48; Mk. xiv. 44); (20) the false witness about "destroying the temple in three days" (Mat. xxvi. 59, 62; Mk. xiv. 55-60); (21) the taunt "Thou that destroyest the temple" (Mat. xxvii. 40; Mk. xv. 29); (22) the utterance of Jesus, "My God, My God, why hast Thou forsaken Me?" with the consequent misunderstanding of the by-standers (Mat. xxvii. 46-49; Mk. xv. 34-36); (23) the utterance of the angel (or an-



gels) at the tomb, "He goeth before you into Galilee; there shall ye see Him" (Mat. xxviii. 7; Mk. xvi. 7).

In considering these passages it is natural to ask whether any reason (besides ignorance of them) can be alleged why Luke should have omitted them. It is scarcely possible to fail to see designs in some of these omissions—for example, in those which relate to John the Baptist and Elias (1), (5), and (10). The author of the Acts of the Apostles is by general consent admitted to be identical with the author of the Third Gospel. Now remembering that Luke in the Acts informs us that, many years after the death of Jesus, there were in Ephesus several disciples who were baptized with the baptism of John, and knew nothing of the Holy Spirit, we may well understand that the author of the Acts finds it necessary, when writing a gospel, to put in as clear a light as possible the subordination of John to Jesus. Accordingly, in place of the graphic description of the austere food and garb of the prophet, he gives a description of his teaching, as containing the elements of a simple and almost commonplace morality, intended merely to prepare the way for a higher teaching, and he adds an express negative from the prophet in answer to those who doubted whether John were the Messiah. Repeatedly does Luke deviate from the common tradition of Matthew and Mark on the subject of Elias; and in each case the object is apparent. Only a close inspection of a harmony of the Gospels will make this clear; but three or four passages may be mentioned which point in this direction. Luke has already (i. 17) declared that John will go before Jesus "in the spirit and power" of Elias, but he cautiously avoids committing himself to the tradition (Mk. ix. 13; Mat. xvii. 13) that John was Elias. The belief in an actual transmigration of souls he will allow the multitude to entertain (ix. 8, 19), but not Herod; for whereas in Mark (vi. 16) Herod says, "Whom I beheaded, viz., John, this man (*οὗτος*, corr. text), is risen from the dead," Luke, by a slight transposition of the traditional words, converts the proposition into a question: "John I beheaded; but who is this man?" And, further, in order to prepare the way for the interview between Herod and the Lord—which he purposes to describe at the end of his Gospel (xxiii. 8, 9), and to refer to in his continuation of the Gospel (Acts iv. 27)—he adds the words, "And he (Herod) was desirous to see Him." Again Mark (ix. 6) tells us that Peter "not knowing *what to answer*," proposed to build three tabernacles for Jesus, Moses, and Elias; but Luke reads (ix. 33), "not knowing *what he said*," as if to caution the reader against supposing that Elias or Moses could be seriously placed on the same level as Jesus. For the same reason he omits the irreverent misunderstanding of the bystander who supposed that Jesus in his last moments called for Elias, and even the utterance itself (Mat. xxvii. 49; Mk. xv. 36).

With reference to many of the other omissions it will be noticed that Luke seems to have before him somewhat different versions of the narratives, which different versions he inserts elsewhere. For example, he gives a version of the calling of the apostle-fishermen, which adds a miraculous draught of fishes, thereby approximating to the narrative in the Fourth Gospel (xxi. 6-11). Again Luke places the murmuring of the Nazarenes much earlier, in the fore-front of the ministry of Jesus, as was very natural, and gives an entirely different version of it. The ministry of the angels after the temptation he omits; but he alone records the ministry of the angel (xxii. 43) when Jesus was tempted in Gethsemane, for which temptation he carefully prepares the way by saying (iv. 13) that the devil departed from Jesus only "for a season." As regards the anointing "for the burial," it is probable we have a different version of it in his

story of the woman that was "a sinner" (vii. 37). The reasons for the omission of the feeding of the four thousand and the withering of the fig-tree are not so obvious. The omission could hardly have been dictated by any desire to minimize the supernatural (seeing that Luke contains many miracles peculiar to himself, and that he does not shrink from giving in full detail the exorcism of the Gadarene). It is possible that he omitted the former as being too similar to the feeding of the five thousand to require to be repeated; and if he regarded it (as the author of the Fourth Gospel does) as having a sacramental meaning, one story of the kind may have seemed sufficient. If the story of the withered fig-tree was regarded by him in the same way (rather as emblematic than as historical), then it may have been replaced in his narrative by the story of the barren fig-tree (peculiar to Luke), to which the master came seeking fruit and finding none. It is also noticeable that the moral (on the power of faith) deduced from the withering of the fig-tree in Matthew and Mark is contained in Luke, but in a different form. In Matthew and Mark it runs: "If ye say to this *mountain*, Be raised up and cast into the sea;" whereas in Luke (xvii. 6) it is, "Ye might have said to this *sycamine tree*, Be rooted up and planted in the sea." This perhaps slightly confirms the supposition that Luke regarded the narrative of the fig-tree rather as a parable than as a fact. But it is important to bear in mind that we have little more than the evidence of conjecture to explain some of Luke's omissions. For example, the story of the walking on the waves, as told by Matthew and Mark, represents the disciples as being alarmed by the thought that the apparition of the Lord was only a spirit (*φάντασμα*); unless Luke considered that the ground of this narrative was occupied by his account of a similar fear when the disciples beheld the Lord after the resurrection, it is hard to suggest any reason for its omission. This class of omissions may be terminated with that numbered above—the compact of Judas concerning the signal. It is obvious here that Luke has another version of the tradition in his mind. He alone of the three records the words of Jesus, "Betrayest thou the Son of Man with a kiss?" thereby making it unnecessary to explain (with Matthew and Mark) that the kiss was a signal fixed by the traitor.

Another class of passages may possibly have been omitted as being not of interest to the Gentile world, or as being liable to misunderstanding or perversion.

The above explanation of Luke's omissions may only partially commend itself to the reader; but few will fail to see that there is at least some method and motive in most of them. It is a matter of certainty that in the Triple Tradition many of Luke's omissions and modifications of phrases and words are not accidental but editorial: it is but natural therefore to suppose (especially when reasons can easily be assigned) that editorial reasons may also explain omissions and modifications of narratives and discourses. Of course it is not maintained that Luke, or any individual editor, made these changes on his own responsibility. Many of them are probably the result of a "Gentile use" which had gradually sprung up in certain churches, and which was not created but adopted and expressed by the author of the Third Gospel. Consequently we are not obliged to suppose that the omission resulted from ignorance. The very fact that it is easy to supply motives and reasons for the omission of these narratives increases their credibility, by diminishing the probability that they were late traditions unknown to the author of the Third Gospel. The passages omitted are generally in the style of the common tradition, and they contain



Incidents of a similar kind to the incidents of the common tradition. It only remains to add that (except in the story of the Syro-Phœnician woman, and, in a lesser degree, in the question of the lawyer about the great commandment) Matthew and Mark closely agree whenever Luke separates himself from them. This is also found frequently to be the case in the Triple Tradition. In the midst of very similar context, if Mark is identical, or nearly so, with Matthew, in the expression of some action, it will be found that Luke often suddenly diverges, or makes some omission.

*The Additions of Mark and Luke.*—Additions of any length are very few :

(1) An exorcism of an unclean spirit (Mk. i. 21-25 ; Lu. iv. 31-35) ; (2) the account of Jesus retiring to a solitary place, when He declares that He must carry the gospel elsewhere (Mk. i. 35-39 ; Lu. iv. 42-44) ; (3) the saying of John the son of Zebedee, "Master, we saw one casting out devils in Thy name, and we forbade him," and the reply of Jesus (Mk. ix. 38-40 ; Lu. ix. 49, 50) ; (4) the short denunciation of the Pharisees that devour widows' houses (Mk. xii. 38-40 ; Lu. xx. 46, 47) ; (5) the story of the widows' mite (Mk. xii. 41-44 ; Lu. xxi. 1-4). Shorter similarities are—(6) a mention of Jesus as being in retirement (Mk. i. 45 ; Lu. v. 16) ; and (7) a mention of "Tyre and Sidon" as places to which the fame of Jesus had spread (Mk. iii. 8 ; Lu. vi. 17). There is a close verbal agreement between Mark and Luke in the exorcism of the "legion" (a name that does not occur in Mark) ; in the raising of the daughter of Jairus ; and in the stilling of the storm. But gradually as Matthew approximates to Mark, Luke deviates from Mark. There is a return to similarity in the preparation for the Passover (Mk. xiv. 12-16 ; Lu. xxii. 7-13) ; but from this point Luke deviates more and more, and, with the exception of two words (*στράβις* and *φόνος*) in the incident of Barabbas, and of a somewhat closer approximation in the incident of Joseph of Arimathæa, it may be almost said that Luke has henceforth nothing in common with Mark, except what is found in the Triple Tradition.

Most of the incidents common to Mark and Luke are so few and so simple that their omission by Matthew requires no explanation. It is possible that the names Jairus and Legion did not exist in the earliest tradition, as it presented itself to Matthew ; the "authority" which Mark illustrates (compare i. 22 with i. 27) by exorcism, Matthew applies (and perhaps justly) rather to our Lord's method of teaching (vii. 28, 29) ; but it is difficult to suppose that any other cause than ignorance could have caused the omission of the saying of Jesus concerning the widow's mite. It is certain that, in some at least of these passages, Mark represents the earlier, and Luke a modified tradition. Luke, writing with a literary purpose, has softened many early irregularities, which in Mark retain their original harshness. It is probable that in all passages common to Mark and Luke alone, wherever Mark and Luke differ, Mark represents an earlier, and Luke a later version of the original. And generally it may be said that Luke follows the tradition of Mark most faithfully when it deals with Galilee, and least when it deals with Jerusalem.

*Additions common to Matthew and Luke.*—These introduce an altogether new element into the tradition. Hitherto the triple tradition of Matthew, Mark and Luke (as well as the double tradition of Matthew and Mark, and of Luke and Mark) has consisted mostly of short "words of the Lord," set in a framework of short narratives, and very seldom agreeing exactly for more than seven or eight consecutive words. But we now come upon "words of the Lord" in Matthew and Luke, some of which agree exactly for several sentences.

What was the origin of this close agreement ? In order to gain some view of the data for solving this problem, we must briefly consider the principal passages common to Matthew and Luke alone.

In the consideration of the passages in which Christ's words as spoken by him are quoted, one fact strikes us at once, that the Lord's prayer is not *verbatim* the same in Matthew and Luke. If *this* is not identical, it might be thought that we cannot expect any words of the Lord to be identical. And indeed, as a matter not of hypothesis but of fact, those words which have most strongly appealed to men's hearts, and have been most frequently on their lips, from the earliest times of the church ; those sayings which have given the tone to Christian life, which have encouraged martyrs, and stimulated waverers, such as "Fear not them which kill the body," "Who-soever shall confess," etc. ; "He that loveth father or mother more than Me," etc.—all these, though identical as regards thought, and similar as regards words, are nevertheless not exactly similar in Matthew and Luke. The exactly similar passages are of a very different nature : they are for the most part passages of a prophetic or historical rather than a doctrinal character with application to individuals. All these passages, dealing as it were on a large scale with the will of God, as it affects religions and nations rather than as it affects individuals, are better fitted for reading in the services of the church than for being transmitted from mouth to mouth in the family from father to son, or from catechist to catechumen, for personal and individual guidance ; and consequently they seem more likely to have been handed down in a book than by means of oral tradition. In proportion as a rhetorical passage limits itself to individual application, it seems to have been modified by oral tradition so as to deviate from exact agreement. The only exception perhaps to this rule is in the denunciation of the Pharisees (16). This passage, being of the historical type, ought (according to our rule) to be identical ; but Luke differs from Matthew considerably. Possibly in the earliest days of the church, and especially in the synagogues of Palestine a few years after the death of Christ, the angry conflicts between the disciples of the Lord and the Pharisees may have frequently reproduced and modified by traditional influences the original form of our Lord's denunciation ; so that perhaps this subject comes naturally under the head of traditional doctrine. It must also be remembered that, as Luke approaches the later period of the work of Christ in Judæa, he deviates more and more both from Matthew and from Mark ; perhaps because there was a Judæan as well as a Galilean tradition of the life of Jesus, and Luke, in the latter part of his history, depended mainly on the former. These two considerations may explain the deviation of Luke from Matthew in the denunciation of the Pharisees.

That the parables should diverge is natural. Their length and number would prevent them from being remembered, or passed from mouth to mouth, with the same fidelity with which the shorter words of the Lord would be preserved ; and as they were probably often repeated by Jesus in varied shapes, no one particular shape of any parable would seem to claim a place in the written document of the words of the Lord ; as being of the same importance as the "Woe to Jerusalem," or the other strains of poetic prophecy. The parable of the sower, coming first in order, and being typical of the rest of the parables, and having appended to it an explanation of the motive of the parabolic teaching, would naturally attract attention from the earliest times, and consequently it found a place in the Triple Tradition ; but this privilege was accorded to no



other parable. There is therefore no ground whatever for inferring from the discrepancy of the language of a parable in Matthew and Luke (*e.g.*, the parable of the lost sheep) that it was not actually uttered by Jesus. The exact similiarity of thought and sequence of incident in that parable, as recorded by Matthew and Luke, proves to demonstration that the two records are derived from one source.

The following are our conclusions therefore about the additions to the Triple Tradition made jointly by Matthew and Luke. (1) Their omission by Mark furnishes no argument for their rejection, inasmuch as Mark also omits the Lord's Prayer, and obviously aims at narrating the acts rather than the sayings of the Lord. (2) Of the additions, some appear to be based upon common tradition, or on documents modified by tradition—principally those short trenchant sayings (including the Lord's Prayer) which are of a universal and private application. (3) Others appear to be based upon a common document; and in these documentary additions (as perhaps to some extent in the rest) Luke seems to have modified the original tradition, in words and phrases, with a view to purity of style and intelligibility, or to remove difficulties. (4) In chronological order and arrangement Matthew and Luke pursue divergent paths; Matthew's object being to group and mass the teaching of the Lord, while Luke aims at supplying motive, occasion, place, and time for each utterance. (5) It is scarcely possible to doubt that the arrangement of neither is to be implicitly adopted. There is much reason to doubt whether what is called the Sermon on the Mount was actually delivered at one time in the shape in which Matthew presents it; and it is equally questionable whether the lamentation over Jerusalem was delivered in a village of Galilee, and whether the denunciation of the Scribes and Pharisees (as murderers, on whom should be avenged all the innocent blood shed from the beginning of the world) was uttered at the table of a Pharisee. (6) As regards the parables, we have to depend—in our conjecture as to the degree to which the thoughts of Jesus have been preserved—mainly upon the presence in them of the same spiritual power and insight which are perceptible in His other recognized genuine sayings. But the dissimilarity of the language of the parables in Matthew and Luke (where the thought is the same) gives no ground for denying that parables on the same subjects, and to the same effect, were actually delivered by Him. (7) Since the hypothesis that Luke borrowed from Matthew is untenable, and since therefore we must suppose that Matthew and Luke borrowed these additions independently from some early document, we may infer that, before the times of Matthew and Luke, a document containing words of the Lord had existed long enough, and had acquired authority enough, to induce two editors or writers of Gospels, apparently representing different schools of thought and writing for different churches, to borrow from it independently.

This last conclusion is of the greatest importance; for though the document may be, and almost certainly was, later than the Triple Tradition, yet it would have the advantage of preserving the original utterances of the Lord comparatively unimpaired by traditional transmutations. When to this consideration is added the authoritative nature of the words of the Lord in this document, their direct reference to events, and the extreme improbability that any disciple would have, or could have, invented them,—for which of the apostles or subordinate disciples could have invented the discourse on "the lilies of the field," or the lamentation over Jerusalem, or the speech which likens John to "a reed shaken by the wind," and pronounces him the greatest of the prophets, yet less

than the least in the kingdom of God?—we are led to infer that in all probability we have in these additions of Matthew and Luke a very close approximation to some of the noblest and most impressive utterances of Jesus Himself. With the exception of the healing of the son of the centurion, and the narrative of the temptation, the additions common to Matthew and Luke introduce no new supernatural element.

*The Additions and Peculiarities of Mark.*—It might be expected that when we come to the additions peculiar to each of the three synoptists we should find some increase to the accounts of supernatural events. Now it seems to be a striking proof of the antiquity of the Second Gospel that we find in it no additions of this kind. Not that Mark does not lay stress on what appears to be supernatural; on the contrary, he records acts of instantaneous healing with greater minuteness of detail than any other evangelist; but we find in Mark no mention of our Lord's birth or childhood, and only the barest prediction of His resurrection. As an explanation of the deficiency of information on the resurrection, it has been frequently suggested that the latter part of the Gospel may have been lost; and, less frequently, that the Gospel was deliberately closed with the prediction of the resurrection by the mouth of an angel, because "the manifestations of the risen Saviour belong (according to the earliest notions) no longer to the earthly sphere of the action of Jesus, and therefore do not fall within the province of the Gospel." Few Greek scholars, however, will be induced to believe that the author of the Second Gospel deliberately chose to end a book on the good news of Christ with the words ἐφοβοῦντο γάρ (ephoboynto gar), for they were afraid. Others have suggested that the last page of the MS. may have been accidentally destroyed. But this suggestion seems to overlook the consideration that the MS. was in all probability written not for a private library but for use in the church, and that it would immediately be multiplied by copies. Again, we know, from reference to Mat. xxviii. 8 and Lu. xxiv. 9, that the common tradition ceases with the return of the women from the Lord's tomb. But it is precisely at this point that the genuine Mark (xvi. 8) also terminates. Now, that a page should have been torn out containing just that part of Mark which followed after the close of the common tradition would be a most remarkable and unlikely coincidence. It seems far more probable that Mark ends his Gospel here because the common tradition ended here, and because he scrupled to add anything to the notes and traditions which he knew to rest upon a higher authority than his own. If this be the true explanation, it stamps with the seal of a higher authority such traditions as have been preserved to us by so scrupulous an author. We proceed therefore to an investigation of the peculiarities of Mark, with the confidence in him increased rather than diminished by the fact that he has neither the introductions nor the appendices which are found in the rest of the Gospel.

The first thing that strikes us in Mark is his duality. Verbosity we might be tempted to call it at the first sight; but, though there is a certain disproportion in the space assigned to detail, duality, and not verbosity, is the better word. It is this duality which gave rise to the erroneous supposition that Mark had borrowed from Matthew and Luke. But it may be shown, by reference to passages where there can be no possibility that Mark borrowed from Matthew and Luke (Mark ii. 19; iii. 5; iii. 27; iii. 22, 30; v. 3, 5; xii. 44), that this duality is a part of Mark's style. But, so far, we merely note that some of Mark's dualities of expression might be explained as double renderings of the same original. Only one parable is peculiar to Mark; it is one that illustrates



(iv. 26-29) the spread of the kingdom of God by the quiet, unperceived and gradual growth of corn. The subdued tone of this (one of the most interesting of all the parables) was perhaps the reason why it was not at first widely known, as it undoubtedly is the reason why modern readers pay it too little attention. Mark also amplifies the story of the Baptist's execution (v. 20-28), and the graphic story of the exorcism of the "legion." For the rest, the other additions peculiar to Mark consist of either dual expressions and amplifications of detail, or of realistic details which would naturally be subordinated, in later times, as likely to be stumbling-blocks.

One proof of the early composition of Mark is the rudeness and even vulgarity of his Greek. He uses a great number of words which are expressly forbidden by the grammarians. Such words as these might naturally find their place in the mongrel Greek of the slaves and freedmen who formed the first congregations of the church in Rome; and they are therefore tokens of a date of composition earlier than that of Matthew and Luke. For it is not conceivable that such terms (some of which would so have jarred upon the ear of an educated Greek as almost to correspond to our "slang") should be substituted in later times for a more tasteful vocabulary; whereas it is easily conceivable, and *a priori* probable, that better Greek should, in the prosperous days of the church, be substituted for worse.

It is a natural characteristic of an unpracticed reporter that he lays undue stress on a few vivid expressions and striking words, and that he reproduces or exaggerates anacolutha which, though not objectionable in a speech, are inconvenient in a book, because they tend to obscure or subordinate the subject matter.

A still more cogent proof of the early date of Mark is that this Gospel contains many expressions which would be likely to be stumbling-blocks in the way of weak believers, so that they are omitted in the later Gospels, and would not have been tolerated except in a Gospel of extreme antiquity.

Mark neither masses similar sayings or deeds, as Matthew does, nor supplies motives and occasions, as Luke does. It is most interesting to note that the words "law," "lawyer," which played so prominent a part in Matthew and Luke, are not to be found at all in Mark's narrative. His business is simply with the life of Christ. Again, whereas Matthew and (in a less degree) Luke are careful to point out that Jesus fulfilled the sayings of the prophets, Mark, on the other hand, though he recognizes in John the Baptist (i. 2) the messenger predicted by the prophets, sees in Jesus a Being too absorbing and interesting as a man to find much time for contemplation of Him as the mere fulfiller of prophecy. In a word, Mark writes of Jesus, not as the destroyer or fulfiller of the law, not as the Messiah predicted by the prophets, not as the refuge of the Gentiles, but rather as a man; subject to anger, and disappointment, and weariness; not knowing all things; not able to do all things; but endowed with strange powers of healing the souls and bodies of men; and carrying out a mysterious plan for the regeneration of the world, through a spirit of childlike obedience to God and brotherly love toward men; lastly, a man who assumed for Himself and for His disciples a power of forgiving sins, and who based all the success of His plans upon His predicted death and resurrection, to be followed by a second coming.

True, Mark's Gospel is disproportioned, inartistic, and uncouth — scarcely, indeed, to be called a book, but rather a collection of graphic anecdotes. Yet it has a unity derived from its naive simplicity and single-mindedness, in recording whatever it records as it was de-

livered from the earliest sources in its entirety; and possibly in that string of anecdotes the development of Christ's life and work may be traced with not less clearness than in the ampler and more artistic production of Luke.

*Additions and Peculiarities of Matthew.*—The preface of the Gospel of Matthew reveals a part of the purpose of the whole Gospel, in tracing the genealogy of Jesus, not from David merely, who was under the law, but from Abraham, who was the receiver of the promise and the father of the faithful. Such a genealogy is the fitting preface of a book which aims at exhibiting the law, not as trampled upon, but as fulfilled and developed into a higher law of promise, in which all the families of the world were to be blessed. But by this time also the church required some distinct affirmation concerning the divine origin of Jesus. The gap left in the opening of Mark's Gospel needed to be filled up. The mere earthly pedigree from Abraham was insufficient; nor did it suffice that Jesus should be declared to be spiritually the Son of God. It was necessary that the verity of the spiritual birth of Jesus from the Father should be embodied in a narrative so expressed as to be intelligible to all.

The differences between the prefaces of Matthew and Luke are obvious, and need no stress laid on them, except as illustrations of the freedom which, at this period, was allowed in the handling of the various introductions to the Gospel tradition. It is obvious, for example, that Luke regards Nazareth as the residence of Joseph and Mary from the first (i. 26; ii. 4), whereas Matthew seems to represent them as selecting Nazareth for their new home after the birth of Jesus and the return from Egypt, only because they were afraid to return to their old home in Judæa, thereby fulfilling an ancient prophecy (ii. 23). Throughout his preface, as throughout his version of the Triple Tradition, Matthew always bears in mind that Jesus came to fulfill the prophets as well as the law. The birth from a virgin (i. 25), the birth in Bethlehem (ii. 6), the return from Egypt (ii. 15), the massacre of the children in Bethlehem (ii. 18), and the residence in Nazareth (ii. 23) are all spoken of as the consequences of prophecies. It is scarcely fanciful, also, to see some reference to the infancy of Moses, and the slaughter of the Israelitish children by Pharaoh in the massacre of the children of Bethlehem by Herod.

Passing next to Matthew's version of the Triple Tradition, we note first the prominence given to the law. Instead of giving a chronological account of our Lord's acts and sayings, Matthew prefers to collect a mass of doctrine into one continuous discourse, known from early times as the Sermon on the Mount. This discourse follows almost immediately on the commencement of His public life; and it contains the new law of the new kingdom. The Sermon on the Mount corresponds to the law given on Mount Sinai, and a thread of contrast runs through the former, comparing in each case that which has been said "of old time" with that which the New Lawgiver prescribed, and showing that in each case the new law, though more gentle, was also more stringent and more exacting than the old. Luke recognizes that no jot or tittle is to pass from the law till all be fulfilled; but nowhere in Luke shall we find the strong language which declares (Mat. v. 19) that he who breaks, or teaches others to break, one of the least of the commandments of the law, shall be called least in the kingdom of God.

The genealogy traced from Abraham, and the stress laid on prophecy, as well as the prominence thus given to the law, all suggest that this book was primarily intended for Jewish readers: and this supposition is con-



firmed by the whole tenor of the Gospel. Matthew finds less space than Luke for the parables which point to the inclusion of the Gentiles, and more for those which point to the exclusion of the workers of lawlessness and of the unworthy Jews. He alone among the evangelists has the saying, "Many are called, but few chosen." But Matthew, more than the rest of the evangelists, seems to move in evil days. Where Luke speaks exultantly of "joy in heaven" over one repentant sinner, Matthew, in more negative and sober phrases, declares that it is not the will of the Father that one of the little ones should perish.

Besides the fulfillment of prophecy mentioned in the preface, Matthew sees several others, (6), (25), (43), (44), (54), which are not mentioned in the Triple Tradition, and these applications of prophecy sometimes contain obvious confusions.

Few new miracles are introduced by Matthew into the body of his work. Two of these consist of acts of healing, and two are connected with Peter, viz., Peter's partial success in walking upon the waves, and his (supposed) extraction of a stater from the mouth of a fish. But the words implying the latter miracle have possibly arisen from a misunderstanding; at all events they leave in the mind "a doubt whether, in this instance, some essential particular may not have been either omitted or left unexplained."

In its moral teaching this Gospel lays special stress upon the sin of religious ostentation and hypocrisy. In a strong passage consistent undissembling wickedness is preferred to dissembled wickedness, and the Pharisees are described at greater length than in any of the other Gospels. Yet this Gospel does not always dwell upon the dark side of Christ's doctrine. It preserves also some of the Lord's most "comfortable" sayings: the blessings upon the meek and merciful; the saying that the angels of the little ones always behold the face of the Father; and, above all, that saying which is a gospel in itself, "Come unto Me, all ye that labor, and are heavy laden," etc.

In speaking of the date of Matthew's Gospel, so far as it can be determined from internal evidence, we must remember that, if the work be composite, the fact that some of Matthew's additions are clearly late will not show that others may not be early.

The uncertainty in which Mark left the resurrection of Jesus would naturally seem to later writers to require to be removed; and accordingly we find that Matthew adds to the vision of angels (two instead of one) a manifestation of Jesus Himself. But the whole of this narrative, though apparently in Matthew's style, and though containing internal evidence of being composed long after the events narrated, is nevertheless strangely disjointed. Yet, its very defects, its disconnectedness, incompleteness and abruptness, indicate a date earlier than that of the more connected and completer narratives of the Third and Fourth Gospels. Matthew separates from Mark's narrative at the departure of the women from the tomb, having previously given an account (repeated by no other evangelist) of the resurrection from the dead of a great number of "saints," who "went into the holy city and appeared unto many." Without any further mention of the place of meeting, the disciples are said to have gone to "the mountain, where Jesus made agreement (*ἐτάξατο*) with them (to meet them)." To avoid this dislocation, there has been suggested the desperate remedy (Weiss, *Matthäusevangelium*, page 582) of rendering *ἐτάξατο*, "laid down the law," with reference to the Sermon on the Mount; but the probable solution is that Matthew here extracts and separates from its context some ancient tradition which is obscured through want of its framework. Again Matthew tells

us that, upon **this mountain**, only the eleven were present, and that while some of them worshiped, others "doubted." This statement is of no value as evidence that it was acknowledged, even so late as the compilation of Matthew's Gospel, that some at least of the manifestations of Jesus were of such a nature that, while they brought immediate conviction to some beholders, they did not at once convince others, even of His nearest disciples.

It is noteworthy that Matthew makes no express mention of the ascension of Jesus. But it is possible that he considers this final manifestation on the mountain top to have terminated with the ascension; for Matthew, describing the farewell of Jesus, appears to have in his mind the picture, contemplated also by Daniel, of the Son of Man endowed with all power and seated on the clouds of heaven.

*Additions and Peculiarities of Luke.*—Before speaking of the passages peculiar to Luke, it will be convenient to consider his avowed purpose in writing, and some peculiarities of his style. The dedication to Theophilus, a name which is now believed by many to be merely typical of every reader who is so far "loved of God" as to be admitted into the church of Christ, states that the author purposes to write an account "in order," and implies that many previous "attempts" (*ἐπεχείρησαν*, a word implying impotence; cf. Acts ix. 2, 9; xix. 13) at similar compilations had not been "in order;" further, it informs us that the object of the treatise was not to tell the reader anything that was new, but rather to give him an ampler knowledge of the certainty of those things which were then and always had been fully believed in the church, even as they had been handed down by those who had been from the beginning eye-witnesses and ministers of the word. Without going so far as to affirm that the word handed down (*παρέδοσαν*) excludes written tradition (Westcott's *Introduction*, 186, 203), is at least remarkable that Luke distinguishes between the "eye-witnesses" and those whose attempts he disapproved—saying that the latter attempted to draw up a "connected narrative," whereas the former merely "handed down" the facts. This amounts almost to a denial on the part of Luke that any "eye-witness" (that is to say, apostle) had up to that time written any narrative (so far as Luke knew) of the life of Christ. It implies also that the words and deeds of the Lord had been recorded by many without arrangement, and that the author purposed to arrange them. The literary and artistic purpose of the author appears in words and phrases, as well as in the conceptions. Writing perhaps principally for readers to whom the Greek of the original tradition would be in many respects distasteful, he substitutes more classical words for many that are used by Matthew and Mark in the Triple Tradition.

The question of Luke's style is specially important because the striking differences between certain portions of his Gospel which are all, though in very different styles, found in his Gospel alone (occurring neither in the Triple Tradition, nor in the parts which Luke has in common with Matthew or in common with Mark), might naturally induce even a careful student to believe that they are composed by different authors.

Considering the additions peculiar to Luke our conclusion must be (1) that as Luke has modified the Triple Tradition, and the words of the Lord common to himself and Matthew, by alterations of words and phrases, so and much more has he modified other traditions or documents which he has introduced into his work; and (2) that those portions of the part of the Gospel peculiar to himself which have a more archaic and Judaic rhythm and vocabulary than the rest may be either



translations from Aramaic documents, or imitations, conscious or unconscious, of the books of the LXX.,—natural adaptations of the style to the subject, like the language of Shakespeare's *Julius Cæsar* as compared with the less simple and dignified language in his English plays of the same date. It is probable, however, that when the evidence is more thoroughly classified than it has hitherto been, it may at least demonstrate the existence of different documents in Luke, whether translations or not.

Passing now to the consideration of Luke's additional subject matter, and reserving the supernatural element to the last, we will speak first of the doctrine. The keynote is struck in the song of Zacharias, and repeated in the first sermon of Jesus in Nazareth. The object of the messenger of Jesus is "to give us knowledge of salvation" by the "remission of sins," by reason of "the tender mercy of our God, whereby the dayspring from on high hath visited us to give light to them that sit in darkness;" and the object of Jesus Himself is "to preach the gospel to the poor," to "heal the broken-hearted, to preach deliverance to the captives, and recovering of sight to the blind." All through the Gospel (or at least the parts peculiar to Luke) there appears to a greater degree than in the First or Second Gospel the contrast between light and darkness, God and Satan, sin and remission of sins, culminating in the triumph of forgiveness and mercy; so that in the very last words of Jesus to His disciples the proclamation of "repentance and remission of sins" is made the prospect of the future gospel to all nations.

The universality of the Gospel is more marked in Luke than in Matthew or Mark. The seventy missionaries appear to be emblematic of the preaching of the gospel to the seventy nations of the earth. The preference of the Gentiles to the Jews would seem to be indicated at the very outset of the public life of Jesus in the sermon at Nazareth, if we could accept this as chronologically and historically accurate.

In connection with the gentler and more inclusive side of the gospel teaching, it may be mentioned that Luke lays especial stress on the part played by women alike in discerning the providence of God, in ministering to Jesus, and in eliciting some of His most helpful utterances.

Probably the most perplexing part of Luke's doctrine is found in the parables of the unjust steward, the unjust judge, and the friend persuaded by importunity.

The supernatural narratives peculiar to Luke, and found in the main body of his treatise, are the miraculous draught of fishes, the raising of the widow's son at Nain, the healing of the woman bound by Satan, the cure of the dropsical man, and the appearance of the angel strengthening Jesus—(18), (25), (46), (49), (75).

Passing from the main body of Luke's Gospel, we come to the introduction, which name we may give to the first two chapters, describing the birth and childhood of Jesus, and the birth of His forerunner, John, the son of Zacharias. The doctrine of the miraculous incarnation, although distinctly stated in Matthew's Gospel, nevertheless required further confirmation. This doctrine appears to have been spoken of from the earliest time, in language which might give rise to different conclusions, according as it was interpreted literally or metaphorically. For example, in the Apocalypse, "the Man Child who was to rule over all nations with a rod of iron," is said to have been born of a woman who was "clothed with the sun, and the moon under her feet, and upon her head a crown of twelve stars," who, after her son had been "caught up into heaven," fled "into the wilderness, where she hath a place prepared of God." It seems certain that the writer represents by

the woman, not the Virgin Mary, but the Church—the Spiritual Israel; and in later times the letter of the Church of Lyons speaks of the "Virgin Mother" as having her children restored to her from the dead (meaning that the church received back, as martyrs, those, who had first recanted and then renounced their recantation). Justin Martyr also protests that, even though he should not be able to prove the preëxistence of Jesus, and even though it should appear that He was born man of men, yet it would still be true that He is Christ; "for," adds he, in his dialogue with Trypho, "there are some, O my friends, of our race, who confess Him to be Christ, but who declare that He is man of men, to whom I do not assent; nor would very many that have formed the same opinion as I have, say as they say, because we have been commanded by Christ Himself not to follow the teachings of men, but the proclamations made by the blessed prophets, and taught by Him." The expression "not very many," indicates that even in Justin's time (150 A.D.) a large though not very large number of Christians in Samaria or Judæa believed that Christ was the son of Joseph, and that a principal part of the evidence for the contrary belief was based upon "the proclamations of the prophets." On the other side, what germs of wild and fanciful doctrine were in the air, may be inferred from the Gospel of the Hebrews, which will not allow that Jesus had even a human mother, but speaks of His mother as being the Holy Spirit. In opposition to these divergent but heterodox beliefs, it became increasingly necessary to maintain the doctrine that Jesus was at once a man, born of a human mother, and divine, born of the heavenly Father; and this needed to be re-affirmed now, during the prosperity of the church, in a somewhat less apologetic tone than characterized the narrative of Matthew.

When we speak of Luke's "supplying the deficiencies of Matthew," we must not be supposed to mean that Luke had before him, or even knew of the existence of, Matthew's Gospel. It has been shown above that he probably knew of no apostolic written narrative. Though Matthew's was probably written some years before Luke's Gospel, very many years might elapse before a treatise used in one church or province might be recognized as authoritative beyond its original boundaries. But by "supplying the deficiencies" we mean that the conscience and faith of the church required in Luke's time some further and more vivid embodiment of the spiritual truth involved in the incarnation than was contained in the unsupplemented narrative of Matthew.

*Language of the Original Traditions.*—It is probable that the Jews, and more especially those in Galilee, were (like the Welsh in the present day) bilingual; and the question has therefore been raised whether our Lord, in his teaching, spoke Greek or Aramaic. The names Cephas, Boanerges, given by our Lord to His Galilean disciples, and the use of Aramaic in His own prayer ("Abba, Father"), and in His last utterance (as recorded by Mat. xxvii. 46; Mk. xv. 34), indicate that both for Himself and for His disciples Aramaic and not Greek was the natural tongue. Although therefore it cannot be denied that Greek, even in Jerusalem, was generally intelligible, yet the scanty evidence derivable from our Lord's words is that He habitually used Aramaic.

But it has been thought that the use of the LXX. in our Lord's quotations from the Old Testament shows that He spoke Greek. The answer is—(1) Even if all the quotations in the synoptists from the Old Testament exactly agreed with the LXX., the agreement would by no means prove that our Lord used the



LXX.; for, in translating Hebrew into Greek, the translator might naturally translate the Hebrew quotations from the Old Testament into the corresponding LXX. version, to which his readers were accustomed. This he might do, even though the LXX. did not quite accurately represent the Hebrew; just as, in translating into English a Latin book, with quotations from the Vulgate, we should naturally use our English version, without considering whether the English exactly represented the Latin. (2) But, in the second place, there is scarcely a single quotation in the Gospels from the Old Testament that exactly agrees with LXX. when the LXX. differs from the Hebrew; and many of the quotations differ slightly both from the Hebrew and from the LXX., and even from the same quotations as elsewhere occurring in the New Testament. And this is just what we might expect. A Hellenist, translating a Hebrew document into Greek (in times when reference to books was far more cumbrous, and trust to memory far more common, than with us) would be likely to be guided principally by his memory of the LXX., but partly by the Hebrew before him. Hence would result translations slightly varying both from the Hebrew and from the LXX., and from other translations made by contemporaneous writers. This argument is, of course, unaffected whether the translation was originally made in a document or, as is more probable, in an oral tradition.

The difference between the Triple Tradition of Matthew, Mark, and Luke, and the Double Tradition of Matthew and Luke, will occur to us as an important feature in our evidence. The widely different phenomena of the Double and the Triple Traditions suggest different origins for the two traditions. Many of the passages common to Matthew and Luke agree together far more closely than even the Latin versions of the Greek Gospels. It would seem to follow that in such cases Matthew and Luke used one and the same Greek document — a translation of some Aramaic original — which document had not undergone much modification by oral tradition before passing into the several treatises of Matthew and Luke. On the other hand, the more varying language of the Triple Tradition, together with the additions and omissions of the three writers, suggests independent translations of an Aramaic original; occasional resemblances suggested by the general “*usus ecclesiasticus*”; divergences created by the local “*usus ecclesiasticus*,” or by the individual style of the editor or editors.

*Date of the Synoptic Writers.*—The composite nature of the synoptic Gospels makes it necessary to distinguish carefully between the date of the compilation of each collective treatise and the date of the composition of the several parts of which that treatise may be composed. The original tradition has been shown to have existed before any of the three synoptics; some common document of the words of the Lord has been shown to have probably existed before Matthew's or Luke's narrative; other documents or traditions might also possibly be shown to exist embedded in each of the synoptists, and the date of each of these parts would be earlier than the date of the whole. Therefore, even if the date of Matthew, or Mark, or Luke could be exactly determined, it would by no means determine the date of the traditions which they contain. It is even possible that a later Gospel may retain in some cases an earlier version of the common tradition of the words of the Lord, as we have seen in the case of Luke's version of the Lord's Prayer.

There is no internal evidence for exactly determining the date of any one of the synoptics. The supposed references in Mark to the death of James, the capture of Jerusalem, or any special earthquakes which might determine the date, are so shadowy as scarcely to deserve consideration. The reference to the death of Zachariah,

the son of Baruch, shortly before the capture of Jerusalem, supposed to be found in Mat. xxiii. 35, is still more improbable. Still the marked difference between the detailed prediction of the fall of the city and the scattering of the people, and the more general predictions in corresponding passages in Matthew and Mark, indicates that Luke's description is modified by reminiscences of the siege of Jerusalem; while Matthew's and Mark's accounts are not thus, or at all events not equally, modified. It is an almost certain inference that Luke compiled after 70 A.D. As regards Matthew and Mark inferences cannot be drawn with equal certainty; for, of course, a compiler may compile at a late date, and yet preserve traditions in their earliest shape; but it is at least a reasonable inference that the compilers of the First and Second Gospels wrote before Luke; and there is a balance of probability in favor of the proposition that they wrote before the fall of Jerusalem.

Coming to more general evidence, we find that (1) Mark, at least in many passages, includes the original tradition from which both Matthew and Luke borrowed; (2) his language, less polished than that of Matthew and Luke, appears more natural for an earlier Gospel in the first and rudest age of the church; (3) Mark's version of the tradition contains many expressions which might naturally be considered “*stumbling-blocks*,” and which, in fact, were rejected or not inserted in the other Gospels; (4) the omission of all account of the manifestations of Jesus after the resurrection indicates a very early date; and though it may be said that this omission arises from the fact that the Second Gospel was accidentally left incomplete, yet this answer will not account for the omission of the genealogies, and of all account of the birth and infancy of Jesus; (5) the interpolated appendix describing the resurrection of Jesus, quoted as it is by Irenæus, shows that even in the time of Irenæus (170 A.D.) the Gospel had been long enough in use to admit of widespread interpolations. All these facts lead to the inference that Mark was compiled earlier than any of the other Gospels, and probably some time before 70 A.D. It is almost impossible to fix any date (worth stating) after which the compilation must have taken place. Those who accept as literally true Mark's accounts of the feeding of the four thousand and five thousand, the walking on the waves, and the exorcism of the Gadarene, may naturally carry back his history to the first years of the Galilean church; and even those who interpret these accounts symbolically are ready to admit that a very short space of time is often quite sufficient, by misunderstanding and accretion, to erect supernatural narratives on a basis of natural and symbolic story. But any approximation to a date *after* which the Gospel was compiled must be deferred till we consider the external evidence.

The narrative of Matthew does not leave us quite so uncertain. The mention of “the Jews,” which is so frequent in the Fourth Gospel, is justly regarded as a proof that the author was writing in times when the Christian church was regarded as definitely and antagonistically separated from the Jewish nation. In the synoptists it is the “Pharisees,” not the “Jews,” who are in conflict with Jesus. But in his account of the resurrection Matthew (xxviii. 15) uses the word in this antagonistic sense. Further, he twice (xxvii. 8; xxviii. 15) uses the expression “even to this day,” of events occurring shortly before or after the death of Jesus — thereby showing that a long interval had occurred between the death of Jesus and the compilation of the narrative. The tone of the Gospel, as compared with Luke, indicates a period when the Jews still existed as a nation, and when the abrogation of the law and the



destruction of the temple were not yet accepted as recognized facts; but the number of parables upon the end of the world and the judgment, the tendency to dwell on exclusion rather than inclusion, on the "many" that are shut out rather than on the "few" that are chosen, and the atmosphere of gloom generally characterizing the Gospel, point perhaps to the crisis immediately preceding the siege of Jerusalem. The additions concerning the birth and incarnation may seem to imply a later date; but, when we reflect how natural it was that in very early times the church should attach importance to these subjects, the wonder will be, not that these narratives were written so soon, but that they were deferred to so late a period as forty years after our Lord's death. It is also extremely remarkable—and a mark of early date as compared with Luke—that even in this developed form of the Gospel the accounts of manifestation of our Lord after his resurrection should be so scanty, doubtful, and vague.

In Luke the signs of later date abound:—(1) the pre-existence and implied failure of many "attempts" to set forth continuous narratives of the things "surely believed;" (2) the mention of the "tradition" of the eye-witnesses and ministers of the word as past, not as present *παρέδοσαν* (i. 2); (3) the dedication of the Gospel to a man of rank (fictitious or otherwise), who is supposed to have been "catechized" in Christian truth; (4) the attempt at literary style and at improvement of the "usus ecclesiasticus" of the common tradition; (5) the composition of something like the commencement of a Christian hymnology; (6) the development of the genealogy and the higher tone of the narrative of the incarnation; (7) the insertion of many passages mentioning our Lord as *ὁ κύριος* not in address, but in narrative; (8) the distinction, more sharply drawn, between the fall of Jerusalem and the final coming; (9) the detailed prediction of the fall of Jerusalem, implying reminiscences of its fulfillment; (10) the very great development of the manifestations of Jesus after the resurrection. The inference from all this evidence would be that Luke was not written till about 80 A.D. at earliest. If it could be further demonstrated that Luke used any Greek Apocryphal book (Judith, for example), and if it could be shown that the book in question was written after a certain date (Renan suggests 80 A.D. for the date of the book of Judith), it might be necessary to place Luke much later; but no such demonstration has been hitherto produced.

*External Evidence.*—The composite nature of the synoptic Gospels will affect the inferences which are drawn from early quotations of passages found in them, where the authors of the Gospels are not expressly mentioned. If, for example, we find in Justin a passage (quoted as a saying of the Lord) which is found both in Matthew and Luke, Justin may indeed have quoted it from Matthew or from Luke; but it is also possible that he may have quoted it neither from Matthew nor from Luke, but either (a) from the common source whence Matthew and Luke derived the passage, or (b) from some other book or tradition, which, like Matthew and Luke, include the passage in its collection or conflation. The same applies to a quotation from the Triple Tradition. It may be quoted from Matthew or from Mark or from Luke; but it is also possible that it may be drawn from none of these, but from the common tradition itself or from some other treatise based on the Triple Tradition.

#### THE FOURTH GOSPEL.

##### *Authorship.*

*Evidence from earliest Tradition.*—Before considering the subject matter of this Gospel, it will be well to

consider the evidence, direct and indirect, bearing on the authorship. The author is not mentioned in the Gospel by name, but only as "the disciple whom Jesus loved," "which also leaned on His breast," and to whom Jesus commended His mother from the cross. The first writer who mentions John as the author in connection with a passage quoted from our Fourth Gospel is said to be Theophilus, who wrote toward the close of the second century. The Muratorian fragment (170 A.D.) speaks of the apostle as the author of a Gospel, but does not quote from it. But Theophilus quotes John i. 1, as written by John, one of those "inspired by the Spirit." It is a natural inference that Theophilus (at so late a date), using the name thus without further definition, meant by "John," the "John" best known to his readers, *i.e.*, John, the son of Zebedee, the apostle. But there is unusually strong evidence to show that John the apostle wrote the Apocalypse, so strong that we may assume the apostolic authorship of that book with more confidence than the authorship of any other book in the New Testament, except some of Paul's epistles. The question therefore arises, how far does the style of the Gospel, which was said by Theophilus (170–180 A.D.) to have been written by John (presumably the apostle), agree with the style of the Apocalypse, which we have so good reason for believing to have been written by the apostle John? If we assume John to have been four or five years younger than his Master, he would be, according to the commonly received date (68 A.D.) of the Apocalypse, about sixty-seven or sixty-eight years of age when he wrote that work. By that age (one would suppose) an author's style would, if ever, have reached its maturity. Even if he were ten years younger than Jesus, so that he was only a little over sixty years of age, yet his style would not be capable of a complete transformation. But when the Gospel is compared with the Apocalypse, instead of similarity, we find an almost complete contrast. The vocabulary, the forms, the idioms, the rhythm, the thought—all is different. That the Apocalypse and the Fourth Gospel should have been written by the same author would be, we will not say impossible, but one of the most marvelous literary phenomena ever authenticated. The change in Shakespeare's style, or in the style of Burke, cannot be compared with this; for those changes can be in part explained by the transition from youth to maturity or old age. Here we have to explain how a writer could completely change language, style and thought, after the age of sixty or sixty-seven years. It is possible, but *a priori* highly improbable.

*External Evidence.*—The general conclusion to which we are led by the external evidence of quotations is that, although some of the *doctrine* of the Fourth Gospel, expressed in words similar to the words of the Fourth Gospel, was probably current in the Ephesian church toward the end of the first half of the second century, yet it was not by that time widely used, if at all, as an authoritative document; nor have we proof that it was so used till the times of Irenæus, *i.e.*, toward the end of the second century, by which time the Gospel was authoritatively quoted as a work of John; and those who so quoted it probably meant by "John" John, the son of Zebedee, the apostle.

*Internal Evidence.*—*The Fourth Gospel compared with the Synoptic Narrative.* In estimating the Fourth Gospel as a history, we must necessarily attach a special importance to those portions in it which cover the synoptic ground; for these will afford us the best means of judging how far the facts of the life of Christ, as well as the language of Christ, may have been transmuted by the author. We will therefore first consider those parts of the Fourth Gospel which afford us an



opportunity of comparing it with the Gospels of the synoptists.

The first point of comparison is the greater scope of the Fourth Gospel as compared with the other three. It includes all past time in its prologue, and exhibits the incarnation of the divine Word as but one act in the drama of the universe.

Nor is its scope in space narrower than in time. The limited scenery of the synoptic stage — Galilee, Samaria, Judæa,—is (in spirit, though not in letter) exchanged here for "the world." As Philo tells us that the tabernacle figured the universe, and that the robes of the high priest represented (*Moses*, iii. 12) the different parts of the world, so the High Priest of the Fourth Gospel, though speaking or working in a narrow province of Syria, is always regarded as officiating at the altar steps of the universe, and bearing with Him the destinies of humanity. "The world" is continually on His lips; and John the Baptist is made to proclaim, even at the very outset of the Messiah's career, that the Lamb of God will take away the sins, not of "the Jews," but of "the world." It is true that Judaism is not ignored. Prophecy is constantly appealed to; and the motive of the Gospel is undoubtedly to show that Jesus is "the Christ," as well as to show that He is the Son of God. Yet nowhere in the Fourth Gospel is found any marked distinction between the Gentiles and Samaritans on the one side and the Jews on the other, as if the former must be neglected for a time, and as if the latter were entitled to priority in the offer of salvation; on the contrary, Christ is described, early in the narrative, as preaching to the Samaritans, and the Samaritan faith (far more general than the isolated case of the Samaritan leper in Luke) serves as a foil to the Jewish unbelief. "The Jews," so far as they are distinguished from others, appear throughout as a nation with whom the writer has no sympathy, as the emblem of rebellious, unspiritual skepticism. Viewing the drama at a greater distance of time than the synoptists, and purposely withdrawing himself to a still more subjectively distant point of view, for the purpose of unity and compression, the author almost ignores the minor distinctions of Pharisees, Sadducees, Herodians, scribes, and lawyers, with which the synoptists have made us familiar. Palestine is seen no longer with the distinctions of a neighboring diversified coast-line, but like a dark mass upon the horizon of the distant East, serving as a foil to the splendor of the rising Sun of Righteousness, which it strives in vain to obscure.

In the miraculous part of our evangelist's narrative especially, there is visible this artistic power of selection and compression. Few miracles are described, not more than eight in all (including the post-resurrection miracle of the draught of fishes), and among these not a single case of exorcism. The element of mere wonder is carefully subordinated to the symbolical element. It is true that the whole Gospel breathes a supernatural atmosphere. Although the Logos, becoming "flesh," is immediately afterward called Jesus or the Son, and is never henceforth mentioned by the name Logos throughout the whole of the Gospel, yet in reality it is still the Logos, rather than Jesus, that is described in the following pages.

*The Motive of the Fourth Gospel Illustrated by the First Epistle of John.*—It has been said above that the First Epistle of John is most closely connected with the Gospel. The connection is so close, in thought as well as in language, that the former may almost be called a summary of the latter. In the Epistle, even more clearly than in the Gospel, we see the author's habit of dealing rather with elements than with nations or individuals. With the exception of the illustration

of "Cain," which he possibly borrowed from Philo (who uses Cain and Abel to denote the earthly and the spiritual principle, *Sacrifices of Cain and Abel*, 1), he prefers to dispense with personal illustrations of principles. He does not, like Paul, speak of Abraham, or Hagar, or Sinai, or Isaac, or Melchisedek, or the Jews, or the Gentiles, but of the world and the flesh, the water, the blood and the spirit, light and darkness, life and death. In the Epistle, as in the Gospel, we see the rejection of Christ explained, not as a casual outcome of individual caprice or wickedness, but as an inevitable result of the eternal antagonism between light and darkness. In the Epistle, as in the Gospel, the author insists that the new commandment of Christ to "love one another" is really an old commandment which men have had from the beginning: a commandment as old as the promptings of the Light which, from the beginning, has "lighted every man coming into the world"—an old commandment only so far made new as it has been brought home to the hearts of men with a quite new intensity by the manifestation of the incarnate Love of God. In the Epistle, as in the Gospel, it is recognized that the antagonism between the world and the spirit, between light and darkness, must go on without truce till one has prevailed, and each man must take one or other side, putting away all hope of compromise.

In this continuous strife between light and darkness the victory is to be gained by faith, but faith supported by witnesses; and we read in the Epistle that the object of our victorious faith is "He that came through water and blood, Jesus Christ; not with the water only, but with the water and the blood; and the Spirit is that which beareth witness, because the Spirit is truth; because they that bear witness are three, the spirit (or breath), and the water, and the blood, and the three are united so as to make up the one."

Passing over many differences of interpretation, and asking, what is the meaning of the water and the blood? we turn to the Gospel, and, in the account of the crucifixion, we find especial stress laid upon the fact that from the side of Jesus "there came out blood and water; and he that hath seen hath borne witness, and his witness is genuine, and he knoweth that he saith true, that ye might believe." In what sense is the "blood" here to be understood? As nourishing? or as cleansing? Almost certainly as cleansing; because above, in this very Epistle, the blood of Jesus is described as cleansing us from all sin. Inferring, then, that the blood signifies a superior purifying or baptismal influence, we necessarily infer simultaneously that the water signifies an inferior baptismal influence. Two purifications are mentioned in all the four gospels, an inferior and preparatory, and a superior and final; the former is the baptism with water, the latter is the baptism with the Holy Spirit, or with the Holy Spirit and fire. But the conception of "baptism with fire," though it is based on the early history of Israel, and appears occasionally in the shape of a "fiery trial" of faith, as well as in the fiery tongues of Pentecost—was soon supplanted by one of two other conceptions, either sprinkling with sacrificial blood, or baptism with the Spirit. This higher purification, or baptism with blood, Jesus brought into the world. He not only came working by means of it, but also, in a certain sense, in it. That is to say, He himself underwent the higher baptism with blood as well as the lower purification with water, which He received from John the Baptist. The agony in Gethsemane, which was that baptism, was typified by Luke in an exudation of "sweat, as it were great drops of blood falling down to the ground." But this baptism was scarcely public enough to be a sufficient fulfillment of the prophecy which predicted that "In that day



there shall be a fountain opened to the house of David, and to the inhabitants of Jerusalem, for sin and for uncleanness." When it became recognized that the Lord was this "fountain," and that His blood was the cleansing stream, then the piercing of his side and the visible emission of the purifying blood from the wound became an effective and almost necessary type of the spiritual purification, and the type of the blood of sprinkling, suggested perhaps by Luke in his description of the agony, fell into the background, being supplanted by the more natural type of the pierced side.

Such a type would all the more commend itself, because, without it, the crucifixion might almost seem incomplete. The mere piercing of the hands and the feet might seem an insufficient fulfillment of the prophecy of the "fountain;" and besides, since crucifixion was generally a lingering death extending over many hours, and since the body of Jesus was taken down on the same day on which it had been attached to the cross (and, according to John, only three or four hours after the commencement of the crucifixion), the record of His death, without the spear wound, might seem to justify the statements of those who maintained that Christ never died at all, and that He was a man only in appearance. Therefore, as a proof of His humanity and of the reality of His death and sufferings, no less than as a fulfillment of the prophecy of the "fountain," it was natural that the latest Gospel should insert, and that the church should readily accept, the witness through blood as well as water, which is so emphatically related by the author of the Gospel, and here appealed to by the author of the Epistle.

It is probable that the Gospel originally ended at xx. 31: "But these are written that ye might believe that Jesus is the Christ the Son of God, and that believing ye might have life through His name." This is a most appropriate termination; and what follows bears every appearance of being an appendix added by the author, describing a miraculous draught of 153 fishes, and a meal of Jesus with seven of the disciples, followed by a dialogue between Jesus and Peter, in which the death of the latter is predicted, and the erroneous tradition that the beloved disciple should not die is shown to be baseless.

Three inferences seem probable from this last narrative: (1) that there had been at Ephesus a tradition (arising perhaps from the extreme old age of John and from some such expression as is recorded in John xxi. 22) that John would not die till the Lord had appeared; (2) that John had died when this account was written (for if he were living and past his ninetieth year, at a time when the church daily expected the coming of the Lord, the Ephesian Christians would not have needed any explanation or softening away of a prediction which would seem to them very likely to be fulfilled); but (3) if John was dead, it must seem that the words "we know" *could* not have been added (as they might be supposed to have been added, according to the Muratorian legend) by Andrew and Philip, who in all probability died before John died; and if John was dead, it must seem that the words *would* not have been added by any elders of Ephesus representing the generation after John; for how could they—who stood on a footing altogether subordinate and inferior in point of reputation, and with no opportunities of information—have ventured to ratify the testimony of the "beloved disciple"?

It is more easy to arrive at negative than at positive results, when evidence is so slight; but it seems probable that the author, attempting to give the spiritual essence of the gospel of Christ, as a gospel of love, and assigning the Ephesian Gospel to the beloved disciple who had presided over the Ephesian church, by way of

honor and respect (for the same reasons which induced the author of the 2d Epistle of Peter to assign that Epistle to the leading apostle), and being at the same time conscious that the book (though representing the Ephesian doctrine generally, and in part the traditions of John the apostle, as well as those of Andrew, Philip, Aristion and John the elder) did not represent the exact words and teaching of the disciple—added the words "We know," etc., partly as a kind of *imprimatur* of Andrew, Philip and the rest; partly in order to imply that other traditions besides those of John are set forth in the book; partly to characterize the book as a Gospel of broader basis and greater authority than the less spiritual traditions issuing from non-apostolic authors, which our evangelist desired to correct or supplement. Nor is it in the least unlikely that this Gospel does represent the teaching of Andrew and Philip, and Aristion and John the elder, as well as that of John. If Papias of Hierapolis gathered up the traditions of these apostles and elders, why not also our author, writing in Ephesus perhaps several years before Papias? It is assuredly not for nothing that the name of "Matthew," mentioned in Matthew, Mark and Luke, is not found in the Fourth Gospel; nor is it without significance that the Gospel begins and ends with an inner apostolic circle. The "twelve" are indeed mentioned, but as in the background. The beloved disciple, Andrew and Peter, Philip and Nathanael—these, and these only, are mentioned as called by Jesus in the beginning; Peter and Thomas, Nathanael and the sons of Zebedee, and two other disciples (presumably the same list as those above, with the addition of James, the son of Zebedee, and Thomas), are mentioned as alone admitted to the sacred meal which closes the Gospel. This fact marks the whole character of the book; it is esoteric and eclectic, and designedly modifies the impression produced by the tradition previously recorded by the synoptics.

GOSPORT, a fortified seaport and market town of Hampshire, England, on the western side of Portsmouth harbor, near its mouth, directly opposite and about a mile from Portsmouth, with which it is connected by a floating bridge moved by a steam engine working on two fixed chains.

GOSSART, JAN, born at Maubeuge toward the close of the fifteenth century, is better known by the name of Mabuse than by that of Jenni Gossart, with which he signed some of his pictures, or that of Jennyn van Henegouwe (Hainault), under which he matriculated in the guild of St. Luke, at Antwerp, in 1503. We know nothing of his life before he attained to manhood; but his works at least tell us that he stood in his first period under the influence of artists to whom plastic models were familiar; and this leads to the belief that he spent his youth on the French border rather than on the banks of the Scheldt. Philip of Burgundy ordered Mabuse to execute a replica for the church of Middleburg; and the value which was then set on the picture is apparent from the fact that Dürer came expressly to Middleburg (1521) to see it. In 1568 the altar-piece perished by fire.

Van Mander's biography accuses Gossart of habitual drunkenness; yet it describes the splendid appearance of the artist as, dressed in gold brocade, he accompanied Lucas of Leyden on a pleasure trip to Ghent, Malines, and Antwerp in 1527. The works of Mabuse are those of a hardworking and patient artist; the number of his still extant pictures practically demonstrates that he was not a debauchee. The marriage of his daughter with the painter Henry Van der Heyden of Louvain proves that he had a home, and did not live habitually in taverns, as Van Mander suggests. His death at Antwerp, on October 1, 1532, is recorded in the portrait engraved by Jerome Cock.



GOSSELIES, a town of Belgium, in the arrondissement of Charleroi, and province of Hennegau, is picturesquely situated on the Piéton and on the Brussels and Charleroi canal, eight miles northwest from Charleroi. Population (1890), 7,660.

GOTHA (originally *Gotegewe*, or *Gotawe*, and later *Gotaha*, or *Gothau*), a town of Germany, formerly capital of the old duchy of Gotha, and now, alternately with Coburg, the residence of the duke of Saxe-Coburg-Gotha, is situated on a canal of the Leina, and on the Thuringian railway, about six miles north of the Thuringian Forest. It consists of the town proper and four suburbs, which are grouped in the shape of a half-moon to the north, west, and east of the hill on which, at the height of 1,086 feet, stands the castle of Friedenstein. With the exception of those in the older portion of the town, the streets are handsome and spacious, and the beautiful gardens and promenades between the suburbs and the castle add greatly to the town's attractiveness. Gotha is one of the most active commercial towns of Thuringia, its manufactures including sausages, for which it has a great reputation, porcelain, tobacco, sugar, machinery, mechanical and surgical instruments, musical instruments, shoes, lamps, and toys. The book trade is represented by about a dozen firms, including that of the great geographical house of Perthes. Population, 28,100.

GOTHENBURG (Swedish, *Göteborg*), the second city and chief commercial town of Sweden, and the capital of a "län" of the same name, is situated in a low valley surrounded by bare hills, on the south bank, and one and two-thirds miles from the mouth of the Götha river, 282 miles west-southwest of Stockholm by rail (by the Götha Canal, 370 miles). Gothenburg is well and regularly built, mostly of stone or brick, with wide and well-paved streets, and, in its general appearance, much resembles an English town. The population of Gothenburg, including suburbs, was 98,647 in 1888.

GOTHIC LANGUAGE. See under GOTHS.

GOTHOFRED, or GODEFROY, the name of a noble French family, of which many members attained distinction as jurists or historians.

The first whose name is associated with the active study of jurisprudence, at the close of the sixteenth century, was DENIS GODEFROY (1549-1621). His most important work is his edition of the *Corpus Juris*. The text given by him was very generally adopted and used in quotation. More than twenty editions of the work were published in various towns of France, Germany and Holland. Godefroy's other writings are very numerous; but they are for the most part either editions of classical authors or compilations which display great industry and learning, but are of little use to the modern student.

THEODORE GODEFROY (1580-1649), the eldest son of Denis, forsook the religion which his father had adopted, and obtained the office of historiographer of France, as well as several important diplomatic posts. His historical works are very numerous. The character of his labors will be judged from the title of his most elaborate production—*Le Cérémonial de France*. Many of his smaller works are devoted to questions of genealogy.

JACQUES GODEFROY (1587-1652), the younger brother of Theodore, has a real claim to the remembrance of students of the history of Roman law, in his edition of the *Theodosian Code*, at which he labored for thirty years. It was this code, and not the *Corpus Juris* prepared under the direction of Justinian, which formed the principal, though not the only source from which the lawyers of the various countries which had formed the Western empire drew their knowledge of Roman law, at all events until the revival of the study of law in the eleventh century at Bologna.

GOTHS. The historical position of the Gothic nation needs to be marked out with special care, both on account of various lax popular uses of the Gothic name, and also on account of much legendary history and many rash ethnological speculations, ancient and modern, which have gathered round the true history of the Gothic people. An ignorant age used the words *Goth* and *Gothic* as vague names of contempt for anything that was thought rude and barbarous. A hardly less ignorant but better disposed age used the word *Gothic* in an equally vague way, but without the same feeling of contempt for anything which was thought to be mediæval or "romantic," as opposed to "classical." The name came also to be used as a philological or ethnological term; we heard of "Gothic nations," "Gothic languages," etc., meaning "Teutonic" in the widest sense. The name was also, first scornfully, then respectfully, applied to a style of architecture which has some claim to be called Teutonic as opposed to Greek or Roman, but which has nothing whatever to do with the Goths as a nation. Long before this, two European sovereigns who had nothing whatever to do with the national Goths, took the title of King of the Goths out of a mere accidental likeness of names. All these uses of the Gothic name must be carefully distinguished from the history of the true national Goths, who play so great a part in Europe from the third to the eighth century of our era. The Goths may on many grounds claim the foremost place among the Teutonic nations which had a share in the break-up of the Roman power. They were among the earliest, if not quite the earliest, of the Teutonic nations to establish themselves within the empire, as distinguished from merely ravaging its frontiers. Their history, too, is closely connected with the geography of the whole empire. Their first historical appearance was in the East; their great historical settlements were made in the West. No Teutonic people fills so great a place in the political and military history of the fourth, fifth, and sixth centuries, and no Teutonic people has left behind it such early remains of a written native literature. The real greatness of the Goths quite accounts for the many vague uses of the Gothic name. Alike in scorn and in honor, the Goths have been, not unreasonably, taken as the representatives of the whole Teutonic race. The wonderful thing is that a people who played so great a part for several ages should have wholly passed away. The Goths have not for many ages existed anywhere as a distinct nation, nor have they given an abiding name to any part of Europe. Franks, Angles, Saxons, Burgundians, Frisians, Thuringians, Lombards, Bavarians, perhaps Vandals, are all visible on the modern map. So several parts of Europe have at different times been known as *Gothia*; but the name was never borne by any large country, and it has nowhere lasted down to modern times.

The chief early authority for the early history of the Goths is their national historian Jordanis, who chiefly followed the Gothic history of Cassiodorus, the minister of Theodoric, and the lost history of Ablavius.

The first certain historical appearance of the Goths is in the lands north of the lower Danube in the third century of our era. For any earlier account of them we have to go either to mythical stories or to ingenious guesses and inferences. There are a remarkable number of national and legendary names which have more or less of likeness to the name *Goth*; and this likeness has naturally led to an unusual number of theories. The Goths first appear in history in the ancient land of the *Gætæ*; and this geographical fact, combined with the likeness of the names, has naturally caused *Gætæ* and *Goths* to be looked on as the same people. The



identification is as old as our first historical mention of the Goths. Claudian always speaks of the Goths as *Getae*. So does the national historian Jordanis. The identity is mentioned doubtfully by Procopius. It is strongly maintained by Jacob Grimm, but is rejected by nearly all later writers. A more famous legend, which has derived its chief currency from Jordanis, brings the Goths first of all from Scandinavia. There is a so-called East and West Gothland in Sweden, but the connection of these lands with the Goths of Roman history is more than doubtful.

On the whole, it seems that there is no trustworthy evidence of a migration of the Goths from Scandinavia, and that the idea was suggested only by the likeness of name between the true Goths and the *Gauts* or *Geátas* of Swedish history. The application of the name *Gothland* to the island *Gotland*, as well as to the continental *Gauthiod*, is a further mistake. Nor does there seem to be any reason for making *Goths* and *Getae* the same. But the identification of the Goths with the *Gothones*, *Γούθρονες*, *Guttones*, on the south coast of the Baltic (which is accepted by Pallmann and Dahn) has much more to be said for it. *Gothi* and *Gothones* are strictly the same name; the double form is usual in the Latin shapes of Teutonic names. The continuous and certain history of the Gothic nation begins in the Roman Dacia.

The history of the East and West Goths, as far as the empire is concerned, falls naturally into three periods. In the third century they are still settled outside the empire, and appear as invaders and ravagers of the Roman territory from outside. After an interval in which they almost sink out of notice, they appear again within the bounds of the empire, in various relations of alliance and enmity, marching to and fro, but not making any lasting settlement. It is not till the fifth century that they begin to form settled powers. During their wandering stage they appear mainly in the Eastern empire. But neither they nor any other Teutonic people founded any permanent settlement within its borders. The historical settlements of the Goths are the short and brilliant dominion of the East Goths in Italy, and the more lasting dominion of the West Goths in Gaul and Spain.

After the first vague mention of the Goths under Antoninus Caracalla, they begin to play a distinct part in the reign of Alexander Severus. They were then in Dacia, and received a tribute or subsidy of some kind (Petrus Patricius, 124, ed. Bonn). The next emperor, Maximin, is claimed by Jordanis (15) as himself of Gothic birth, but we may suspect the usual confusion with the *Getae*. The narrative of Jordanis begins from this point to put on a more historical character, and his account is helped out by various notices in the Augustan history. In the reign of Philip (244-248 A.D.) they passed the Danube and ravaged Mœsia, and in 251 the emperor Decius fell in battle against them. From this time they ravaged eastern Europe and western Asia far and wide (251-268). They carried on their warfare by sea, and reached as far east as Trebizond. And it seems to have been now that the first permanent Gothic settlement was made, though not strictly within the lands of the empire. This was in the Tauric Chersonesus or Crim. Here their settlement lasted for many ages, and they became allies rather than subjects of the empire in the reign of Justinian. Within the empire the Gothic inroads met with repulses at several points, especially from the local forces of Athens under the historian Dexippus. At last, in 269, the Goths suffered a decisive defeat from the emperor Claudius, at Naissus, in Dardania, which formed an epoch in Gothic history. It answers to the repulse of

the Saxons from Britain by the elder Theodosius. The first attempt at Gothic settlement south of the Danube had been premature. It had to be repeated at a later time with greater success.

Further victories over the Goths are attributed to Aurelian. But the chief event of his reign was one which amounted to a legal acknowledgement of Gothic occupation north of Danube. The Roman legions were withdrawn from Dacia, and the name of Trajan's great conquest was transferred to the land south of the Danube (274). That is, the great river was established as the boundary between the Roman and Gothic dominions. The wisdom of this cession is shown by its being followed by a period of ninety years in which the peace between the Goths and the empire was seldom seriously broken. The chief interruption was during the reign of Constantine, when the Gothic king Araric invaded the empire, and, after some momentary successes, was driven back. In the middle of the fourth century a great power arose under the East-Gothic king Ermanaric (less correctly *Hermanric*; the name is the same as *Eormenric*, in the royal line of Kent), of the house of the Amali, which was reckoned to be the noblest among the Goths. Yet there is something unsatisfactory in the way in which we read vague accounts of the greatness of his power, with hardly a glimpse of himself personally. The period assigned to his reign is full of stirring events, in which we get a clear conception of much lesser Gothic chiefs, but none of Ermanaric himself. Jordanis claims for him a vast dominion stretching from the Danube to the Baltic, and he is specially emphatic on the subjection of the Slavonic nations to the rule of the Gothic overlord. With regard to the Gothic nations, we can see that the rule of Ermanaric was a mere overlordship. The West-Goths appear as a distinct people, with the power of making war and peace on their own account. According to the view of some modern writers the outlying Gothic settlement in Crim had been Christian and Catholic from the beginning; but toward the end of the fourth century Christianity in its Arian form began to be gradually accepted by the great mass of the Gothic nations. This was mainly the work of the teaching of Ulfila (see ULFILA), the Gothic apostle and translator of the Scriptures into the Gothic tongue. The distinction between Christian and heathen Goths remains of political importance for some time. But both East and West Goths had fully embraced Arianism long before the end of the fifth century, while the Goths of Crim seem to have remained Catholic, and received Catholic bishops from Saint John Chrysostom, and afterward from Justinian.

Toward the end of the reign of Ermanaric several causes joined together to break his great dominion asunder. There were clearly signs of division between East and West Goths, between Christians and heathens, as well as discontents among the subject nations. These causes of division were now strengthened by pressure from without. Now began the first of those movements of the Turanian races into the lands north of the Danube, which have had such an effect on the history of southeastern Europe down to our own time. The Huns pressed on the new dominion of the Goths, which was already beginning to break in pieces. Ermanaric died at the age, it is said, of 110, by the hands of subject princes stirred to wrath by his cruelties (Jordanis, 24). All thought of a lasting Gothic dominion north of the Danube died with him. With his fall the movements south of that river begin again on a great scale.

From this time the history of the East and West Goths parts asunder, to be joined together again only



incidentally and for a season. The great mass of the East-Goths stayed north of the Danube, and passed under the overlordship of the Hun. They do not for the present play any important part in the affairs of the empire. The great mass of the West-Goths crossed the Danube into the Roman provinces, and there played a most important part in various characters of alliance and enmity. The great migration was in 376, when they were allowed to pass as peaceful settlers under their chief Frithigern. His rival Athanaric seems to have tried to maintain his party for a while north of the Danube in defiance of the Huns; but he had presently to follow the example of the great mass of the nation. The peaceful designs of Frithigern were meanwhile thwarted by the ill-treatment which the Goths suffered from the Roman officials, which led first to disputes and then to open war. In 378 the Goths won the great battle of Adrianople, in which the emperor Valens was killed. His successor, Theodosius the Great, made terms with them in 381, and the mass of the Gothic warriors entered the Roman service as *federati*. Many of their chiefs were in high favor; but it seems that the orthodox Theodosius showed more favor to the still remaining heathen party among the Goths than to the larger part of them who had embraced Arian Christianity. Athanaric himself came to Constantinople in 381; he was received with high honors, and had a solemn funeral when he died.

The death of Theodosius in 395 broke up the union between the West-Goths and the empire. Dissensions arose between them and the ministers of Arcadius; the Goths threw off their allegiance, and chose Alaric as their king. This was a restoration alike of national unity and of national independence. The royal title had not been borne by their leaders in the Roman service. Alaric's position is quite different from that of several Goths in the Roman service, who appear as simple rebels. His whole career was taken up with marchings to and fro within the lands, first of the Eastern, then of the Western empire. The Goths are under him an independent people under a national king; their independence is in no way interfered with if the Gothic king, in a moment of peace, accepts the office and titles of a Roman general. But under Alaric the Goths make no lasting settlement. In the long tale of intrigue and warfare between the Goths and the two imperial courts which fills up this whole time, cessions of territory are offered to the Goths, provinces are occupied by them, but as yet they do not take root anywhere; no Western land as yet becomes *Gothia*. Alaric's designs of settlement seem in his first stage to have still kept east of the Adriatic, in Illyricum, possibly in Greece. Toward the end of his career his eyes seem fixed on Africa.

Greece was the scene of his great campaign in 396, the second Gothic invasion of that country. In this campaign the religious position of the Goths is strongly marked. The Arian appeared as an enemy alike to the pagan majority and the Catholic minority; but he came surrounded by monks, and his chief wrath was directed against the heathen temples. His Italian campaigns fall into two great divisions, that of 402-3, when he was driven back by Stilicho, and that of 408-10, after Stilicho's death. In this second war he thrice besieged Rome (408, 409, 410). The second time it suited a momentary policy to set up a puppet emperor of his own, and even to accept a military commission from him. The third time he sacked the city, the first time since Brennus that Rome had been taken by an army of utter foreigners.

Under Ataulf, the brother-in-law and successor of Alaric, another era opens, the beginning of enterprises

which did in the end lead to the establishment of a settled Gothic monarchy in the West. The position of Ataulf is well marked by the speech put into his mouth by Orosius. He had at one time dreamed of destroying the Roman power, of turning *Romania* into *Gothia*, and putting Ataulf in the stead of Augustus; but he had learned that the world could be governed only by the laws of Rome, and he had determined to use the Gothic arms for the support of the Roman power. And in the confused and contradictory accounts of his actions we can see something of this principle at work throughout. Gaul and Spain were overrun both by barbarian invaders and by rival emperors. The sword of the Goth was to win back the lost lands for Rome. And, amid many shiftings of allegiance, Ataulf seems never to have wholly given up the position of an ally of the empire. His marriage with Placidia, the daughter of the great Theodosius, was taken as the seal of the union between Goth and Roman, and, had their son Theodosius lived, a dynasty might have arisen uniting both claims. But the career of Ataulf was cut short at Barcelona in 415, by his murder at the hands of another faction of the Goths. The reign of Sigeric was momentary. Under Wallia in 418 a more settled state of things was established. The empire received again, as the prize of Gothic victories, the Tarraconensis in Spain, and Novempopulana and the Narbonensis in Gaul. The "second Aquitaine," with the sea-coast from the mouth of the Garonne to the mouth of the Loire, became the West-Gothic kingdom of Toulouse. The dominion of the Goths was now strictly Gaulish, their lasting Spanish dominion does not yet begin.

The reign of the first West-Gothic Theodoric (418-451) shows a shifting state of relations between the Roman and Gothic powers; but, after defeats and successes both ways, the older relation of alliance against common enemies was again established. At last Goth and Roman had to join together against the common enemy of Europe and Christendom, Attila the Hun. But they met Gothic warriors in his army. By the terms of their subjection to the Huns, the East-Goths came to fight for Attila against Christendom at Châlons, just as the Servians came to fight for Bajazet against Christendom at Nicopolis. Theodoric fell in the battle (451). After this momentary meeting, the history of the East and West Goths again separates for a while. The kingdom of Toulouse grew within Gaul at the expense of the empire, and in Spain at the expense of the Suevi. Under Euric (466-488) the West-Gothic power again became largely a Spanish power. The kingdom of Toulouse took in nearly all Gaul south of the Loire and west of the Rhone, with all Spain, except the northwest corner, which was still held by the Suevi. Provence alone remained to the empire. The West-Gothic kings largely adopted Roman manners and culture; but, as they still kept to their original Arian creed, their rule never became thoroughly acceptable to their Catholic subjects. They stood therefore at a great disadvantage when a new and aggressive Catholic power appeared in Gaul through the conversion of the Frank Chlodwig. Toulouse was, as in days long after, the seat of an heretical power, against which the forces of northern Gaul marched as on a crusade. In 507 the West-Gothic king Alaric fell before the Frankish arms at Bouglé, near Poitiers, and his kingdom, as a great power north of the Alps, fell with him. That Spain and a fragment of Gaul still remained to form a West-Gothic kingdom was owing to the intervention of the East-Goths under the rule of the greatest man in Gothic history.

When the Hunnish power broke in pieces on the death of Attila, the East-Goths recovered their full in-



dependence. They now entered into relations with the empire, and were settled on lands in Pannonia. During the greater part of the latter half of the fifth century, the East-Goths play in southeastern Europe nearly the same part which the West-Goths played in the century before. They are seen going to and fro in every conceivable relation of friendship and enmity with the Eastern Roman power, till, just as the West-Goths had done before them, they pass from the East to the West. They are still ruled by kings of the house of the Amali, and from that house there now steps forward a great figure, famous alike in history and in romance, in the person of Theodoric, son of Theodemir. Born about 454, his childhood was spent at Constantinople as a hostage, where he was carefully educated. The former part of his life is taken up with various disputes, intrigues, and wars within the Eastern empire, in which he has as his rival another Theodoric, son of Triarius, and surnamed Strabo. This older but lesser Theodoric seems to have been the chief (not king) of that branch of the East-Goths which had settled within the empire at an earlier time. Theodoric the Great, as he is sometimes distinguished, is sometimes the friend, sometimes the enemy, of the empire. In the former case he is clothed with various Roman titles and offices, as patrician and consul; but in all cases alike he remains the national East-Gothic king. It was in both characters together that he set out in 488, by commission from the emperor Zeno, to recover Italy from Odoacer. By 493 Ravenna was taken; Odoacer was killed by Theodoric's own hand; and the East-Gothic power was fully established over Italy, Sicily, Dalmatia, and the lands to the north of Italy. In this war the history of the East and West-Goths begins again to unite, if we may accept the witness of one writer (Anon. Vales. 728) that Theodoric was helped by West-Gothic auxiliaries. The two branches of the nation were soon brought much more closely together, when, through the overthrow of the West-Gothic kingdom of Toulouse, the power of Theodoric was practically extended over a large part of Gaul and over nearly the whole of Spain. A time of confusion followed the fall of Alaric, and, as that prince was a son-in-law of Theodoric, the East-Gothic king stepped in as the guardian of his grandson Amalaric, and preserved for him all his Spanish and a fragment of his Gaulish dominion. Toulouse passed away to the Frank; but the Goth kept Narbonne and its district, the land of Septimania—the land which, as the last part of Gaul held by the Goths, kept the name of *Gothia* for many ages. While Theodoric lived, the West-Gothic kingdom was practically united to his own dominion. He seems also to have claimed a kind of protectorate over the Teutonic powers generally, and, indeed, to have practically exercised it, except in the case of the Franks.

The East-Gothic dominion was now again as great in extent, and far more splendid, than it could have been in the time of Ermanaric. But it was now of wholly different character. The dominion of Theodoric was not a barbarian but a civilized power. His two fold position ran through everything. He was at once national king of the Goths, and successor, though without any imperial titles, of the Roman emperors of the West. The two nations, differing in manners, language and religion, lived side by side on the soil of Italy; each was ruled according to its own law, by the prince who was, in his two separate characters, the common sovereign of both. The picture of Theodoric's rule is drawn for us in the state papers drawn up in his name and in the names of his successors by his Roman minister Cassiodorus. The Goths seem to have been thick on the ground in northern Italy; in the south they formed little more than garrisons. In Theodoric's

theory the Goth was the armed protector of the peaceful Roman; the Gothic king had the toil of government, while the Roman consul had the honor. All the forms of the Roman administration went on, and the Roman polity and Roman culture had great influence on the Goths themselves. The rule of the prince over two distinct nations in the same land was necessarily despotic; the old Teutonic freedom was necessarily lost. Such a system as that which Theodoric established needed a Theodoric to carry it on. It broke in pieces after his death.

On the death of Theodoric (526) the East and West Goths were again separated. The few instances in which they are found acting together after this time are as scattered and incidental as they were before. Amalaric succeeded to the West-Gothic kingdom in Spain and Septimania. Provence was added to the dominion of the new East-Gothic king Athalaric, the grandson of Theodoric through his daughter Amalasontha. The weakness of the East-Gothic position in Italy now showed itself. The long wars of Justinian's reign (535–555) recovered Italy for the empire, and the Gothic name died out on Italian soil. The chance of forming a national state in Italy by the union of Roman and Teutonic elements, such as those which arose in Gaul, in Spain, and in parts of Italy under Lombard rule, was thus lost. The East-Gothic kingdom was destroyed before Goths and Italians had at all mingled together. The war of course made the distinction stronger; under the kings who were chosen for the purposes of the war national Gothic feeling had revived. The Goths were now again, if not a wandering people, yet an armed host, no longer the protectors but the enemies of the Roman people of Italy. The East-Gothic dominion and the East-Gothic name wholly passed away. The nation had followed Theodoric. It is only once or twice after his expedition that we hear of Goths, or even of Gothic leaders in the eastern provinces. From the soil of Italy the nation passed away almost without a trace, while the next Teutonic conquerors stamped their name on the two ends of the land, one of which keeps it to this day.

The West-Gothic kingdom lasted much longer, and came much nearer to establishing itself as a national power in the lands which it took in. But the difference of race and faith between the Arian Goths and the Catholic Romans of Gaul and Spain influenced the history of the West-Gothic kingdom for a long time. The Arian Goths ruled over Catholic subjects, and were surrounded by Catholic neighbors. The Franks were Catholics from their first conversion; the Suevi became Catholics much earlier than the Goths. The African conquests of Belisarius gave the Goths of Spain, instead of the Arian Vandals, another Catholic neighbor in the form of the restored Roman power. The Catholics everywhere preferred either Roman, Suevian, or Frankish rule to that of the heretical Goths; even the unconquerable mountaineers of Cantabria seem for a while to have received a Frankish governor. In some other mountain districts the Roman inhabitants long maintained their independence, and in 534 a large part of the south of Spain, including the great cities of Cadiz, Cordova, Seville, and New Carthage, was, with the good will of its Roman inhabitants, reunited to the empire, which kept some points on the coast as late as 624. That is to say, the same work which the empire was carrying on in Italy against the East-Goths was at the same moment carried on in Spain against the West-Goths. But in Italy the whole land was for a while won back, and the Gothic power passed away forever. In Spain the Gothic power outlived the Roman power, but it outlived it only by itself becoming in some meas-



ure Roman. The greatest period of the Gothic power as such was in the reign of Leovigild (567-586). He reunited the Gaulish and Spanish parts of the kingdom which had been parted for a moment; he united the Suevian dominion to his own; he overcame some of the independent districts, and won back part of the recovered Roman province in Southern Spain. He further established the power of the crown over the Gothic nobles, who were beginning to grow into territorial lords. The next reign, that of his son, Recared, (586-601), was marked by a change which took away the great hindrance which had thus far stood in the way of any national union between Goths and Romans. The king and the greater part of the Gothic people embraced the Catholic faith. A vast degree of influence now fell into the hands of the Catholic bishops; the two nations began to unite; the Goths were gradually Romanized, and the Gothic language began to go out of use. In short, the Romance nation and the Romance speech of Spain began to be formed. The Goths supplied the Teutonic infusion into the Roman mass. The kingdom, however, still remained a Gothic kingdom. "Gothic," not "Roman" or "Spanish," is its formal title; only a single late instance of the use of the formula "regnum Hispaniæ" is known. In the first half of the seventh century that name became for the first time geographically applicable by the conquest of the still Roman coast of southern Spain. The empire was then engaged in the great struggle with the Avars and Persians, and, now that the Gothic kings were Catholic, the great objection to their rule on the part of the Roman inhabitants was taken away. The Gothic nobility still remained a distinct class, and held, along with the Catholic prelacy, the right of choosing the king. Union with the Catholic church was accompanied by the introduction of the ecclesiastical ceremony of anointing, a change decidedly favorable to elective rule. The growth of those latter ideas which tended again to favor the hereditary doctrine had not time to grow up in Spain before the Mahometan conquest (711). The West-Gothic crown therefore remained elective till the end. The modern Spanish nation is the growth of the long struggle with the Mussulmans; but it has a direct connection with the West-Gothic kingdom. We see at once that the Goths hold altogether a different place in Spanish memory from that which they hold in Italian memory. In Italy the Goth was but a momentary invader and ruler; and the Teutonic element in Italy comes from other sources. In Spain the Goth supplies an important element in the modern nation. And that element has been neither forgotten nor despised. Part of the unconquered region of northern Spain, the land of Asturia, kept for a while the name of Gothia, as did the Gothic possessions in Gaul and in Crim. The name of the people who played so great a part in all southern Europe, and who actually ruled over so large a part of it, has now wholly passed away; but it is in Spain that its historical impress is to be looked for.

*Gothic Language.*—By this name, which may be taken generally as denoting the idioms of the various divisions of the Gothic nation, is more particularly meant the language exhibited in certain fragments of a translation of the Bible and other minor documents, which, although preserved in manuscript not dating farther back than perhaps the fifth century, and clearly written in Italy during the rule of the East-Goths, are commonly assumed to have originated among the West-Goths at the time when they were seated in Mœsia, and to be therefore older by at least a century than the manuscripts themselves. It is chiefly due to this assumption that the more distinctive name of *Mæsogothic*

language is often used, in England and elsewhere, as the simple *Gothic*. The latter name, however, seems to be more appropriate, in spite of the great probability of the assumption referred to,—since it is, for obvious reasons, utterly impossible to prove that the language of the West-Goths at that time differed from that of the East-Goths, or, even if there was any difference, to show that our manuscripts represent the original forms of the speech of their supposed West-Gothic author.

We have no direct evidence of the character of the Gothic language until the time of the above-mentioned manuscripts; but some conclusions regarding a more archaic state of the language may be drawn from a careful examination of the numerous words borrowed from Gothic at a much earlier period by some of the Finnish tribes originally dwelling in the interior of Russia. It may be safely assumed that some, at least, of these words still retain forms of the Gothic language from as early a period as perhaps the first or second century B.C. By the same date the Goths, as well as the other Teutonic nations, were no doubt already in possession of the Runic alphabet, an adaptation of a particular form of the Latin characters to their special wants and uses. No traces of this alphabet, however, have been left, except the already mentioned short inscription of the Bucharest ring, a list of the Gothic names of these runes, preserved in a Vienna manuscript of the ninth century, and some letters in Ulfila's Gothic alphabet, which soon supplanted the less convenient Runic characters, and so helped to inaugurate the short literary period of the Gothic language so closely connected with the name of that prelate.

Ulfila, or rather Vulfila (310-380 A.D., see ULFILA), was a man of the most profound learning. He not only invented, as has been said, a new alphabet for his literary purposes, but was also able to preach and to write in Latin and Greek as well as in his native Gothic language, and he is reported to have left behind him a great number of tracts and translations in these three idioms. The principal work of his life, however, was his translation of the Bible, parts of which seem to have reached us in the famous *Codex Argenteus*, now at Upsala, and in several minor fragments at Wolfenbüttel (*Codex Carolinus*) and Milan (*Codices Ambrosiani*, including some leaves now kept at Rome and Turin). In this way we possess the greater part of the gospels, considerable portions of the epistles, and a few fragments of the Old Testament; there is also a fragment of a commentary on St. John's gospel, commonly called *Skeireins* (or "explanation"), and the fragment of a calendar which has been already mentioned as containing the original name of the Gothic people. The whole character of the translation too seems to indicate a man of Ulfila's mental power and theological learning. Although it cannot be denied that several alterations of the original have been introduced into our texts at a later time, it is certain both that the author carefully interpreted the Greek text (which was of course the fundamental source of his work), and also that he consulted, and in not a few places followed, the old Latin versions where his own ideas seemed to differ from those of his Greek authorities.

The Gothic language did not very long survive the times of Ulfila. From Mœsia, where it had gained its highest literary culture, it disappeared together with the Goths, when they were driven from these parts by later migrations. In the western portions of Europe, that is, in Italy, France and Spain, whither it had been carried by the emigrants, the Gothic language seems to have died out even sooner than the Gothic nationality, giving way to the overpowering influence of Latin, and leaving behind it only a few indistinct relics in some



proper names and other words that had been received into that victorious language.

It is well known that the literary remains of Gothic are (with the exception, perhaps, of a few Runic inscriptions belonging to the Scandinavian languages) by several centuries the oldest specimens of Teutonic speech, and therefore have a particular value for the student of the history of that family of languages. Notwithstanding this fact, it would be altogether wrong to regard Gothic as the common source of the more modern stages of these idioms. Although very archaic in many of its forms and sounds, it is in these still far removed from the original features of the common language, as that was spoken before any separation of Teutonic tribes had taken place. Most nearly related to it seem to have been the Scandinavian languages, which are now generally assumed to have formed, together with Gothic, the so-called eastern branch of the Teutonic family, while English, Frisian and Low and High German belonged to a western division.

**GOTTFRIED.** Meister Gottfried of Strasburg, the most brilliant German poet of the Middle Ages, flourished about the end of the twelfth and beginning of the thirteenth century. Of his life and position we have no certain information, for he has told us next to nothing about himself, and contemporary records are dubious and confusing. His chief work was written about 1210, and we may confidently place his death between 1210 and 1220.

**GÖTTINGEN**, the chief town of a circle of the same name in the land-drostei of Hildesheim and province of Hanover, Prussia, is pleasantly situated at the foot of the Hainberg, in the fertile valley of the Leine, about sixty-seven miles to the south of Hanover, on the Hanover and Cassel railway. It is traversed by the Leine, which separates the Altstadt from the Neustadt and Masch; and it is surrounded by ramparts which are planted with lime trees and form an agreeable promenade. The streets in the older part of the town are, for the most part, crooked and narrow, but the newer portions are spacious and regularly built. Apart from the churches and the numerous university buildings, it has few structures of any public importance. The university, the famous Georgia Augusta, founded by George II. in 1734, and opened in 1737, rapidly attained a leading position, and in the year 1823 its students numbered 1,547. Political disturbances, in which both professors and students were implicated, lowered the attendance to 860 in 1834; and the expulsion of the famous seven professors (Albrecht, Dahlmann, Ewald, Gervinus, Weber, and the brothers Grimm) in 1837, still further reduced its prosperity. The events of 1848, on the other hand, told somewhat in its favor; and since the annexation of Hanover in 1866 it has been carefully cherished by the Prussian government. Its recent professoriate includes, among other distinguished names, those of Benfey, Lagarde, Lotze, Ritschl, and Weber. Among those who have been teachers within its walls, may be mentioned, besides the seven already named, Haller, Gesner, Gatterer, Sprengel, Heyne, Blumenbach, Herbart, Heeren, O. Müller, K. F. Hermann, and Eichhorn. Neander, Ewald, and the distinguished chemist Bunsen, it may be added, were natives of Göttingen. The university library contains upward of 500,000 printed volumes and 5,000 manuscripts.

**GOTTSCHALK**, or **GOTESCHALCUS**, surnamed **FULGENTIUS**, a prominent figure in one of the most important theological controversies of the ninth century, was the son of Berno, a Saxon count. While returning from a pilgrimage to Rome in the year 847, Gottschalk, happening to pass a night at a hospice in Friuli,

came into contact with Notting, the newly elected bishop of Verona, and expounded to him his peculiar views. The bishop, apparently without saying much at the time, carried word to Hrabanus Maurus, who, meanwhile, had become archbishop of Mainz; the latter lost no time in issuing two letters, one to his informant and another to Count Eberhard of Friuli, in both which he denounced the opinions of Gottschalk with some recklessness and great violence. At a synod held in Mainz in presence of the emperor in 848, Gottschalk presented himself with a written explanation and defense of his views; he was, however, very summarily found guilty of heresy, and handed over to his ecclesiastical superior, Hincmar of Rheims, to be dealt with as his crime might deserve, and sentenced to be whipped severely and rigorously imprisoned. The place selected for his captivity was the monastery of Hautvilliers in the diocese of Rheims, and here he languished throughout the remainder of his life, a period of twenty years, notwithstanding the efforts of influential friends and his own pitiful appeals.

**GOTTSCHED**, **JOHANN CHRISTOPH**, a German author and critic of considerable influence in his own time, was born February 2, 1700, at Judithenkirch, near Königsberg, and died December 12, 1766. He was a pedant, but there is no doubt that he did good and lasting service to German literature.

**GÖTZ**, **JOHANN NIKOLAUS**, a minor German poet, born at Worms, July 9, 1721. He died at Winterberg November 4, 1781. The writings of Götz consist of a number of short lyrics and several translations, of which the best is a rendering of Anacreon.

**GOUDA**, or **TER GOUWE**, a town of the Netherlands, in the province of South Holland, at the confluence of the Gouw with the Yssel, twelve miles northeast of Rotterdam, at the junction of the railway from that city with the line between the Hague and Utrecht. Population (1890), 17,070.

**GOUDIMEL**, **CLAUDE**, composer of the sixteenth century, must be named among the founders of modern music. The French and the Belgians claim him as their countryman, but the place of his birth is not sufficiently established. In all probability, however, he was born at Vaison near Avignon, about the year 1510. In 1540 we find him established in Rome at the head of a musical school, and here, among many other celebrated musicians, Palestrina, the greatest master of the early Italian school, and one of the greatest masters of all schools, was among his pupils. About the middle of the century he seems to have left Rome for Paris, where, in conjunction with Jean Buchemin, he published, in 1555, a setting of Horace's *Odes*. Infinitely more important is another collection of vocal pieces, a setting of the celebrated French version of the Psalms by Marot and Beza, published in 1565. It is written in four parts, the melody being assigned to the tenor. Some of the tunes were probably of popular origin, and they are still used by the French Protestant Church. He was killed at Lyons, August 24, 1572.

**GOUGH**, **HUGH GOUGH**, **VISCOUNT**, British field-marshal, was of Irish origin, and was a descendant of Francis Gough, who was made bishop of Limerick in 1626. He was born at Woodstown, Limerick, November 3, 1779. After holding for a short time a commission in his father's regiment of militia, he was transferred to the line as ensign in August, 1794, and was soon after promoted lieutenant. In the following year he served with the 78th Highlanders at the Cape of Good Hope, taking part in the capture of Cape Town and of the Dutch fleet in Saldanha Bay. His next service was in the West Indies, where, with the 87th (Royal Irish Fusiliers), he shared in the attack on Porto Rico, the



capture of Surinam, and the brigand war in St. Lucia. In 1809 he was called to take part in the Peninsular War, and, joining the army under Wellington, commanded his regiment as major in the operations before Oporto, by which the town was taken from the French. At Talavera he was severely wounded, and had his horse shot under him. For his conduct on this occasion he was afterward promoted lieutenant-colonel, his commission, on the recommendation of Wellington, being antedated from the day of the duke's dispatch. Gough did not attain the rank of field-officer till 1830, when he was promoted major-general. Seven years later a new epoch opened for him; he was sent to India to take command of the Mysore division of the army. But not long after his arrival in India, the difficulties which had arisen between the Chinese and British Governments, and which led to the first Chinese war, made the presence of an energetic general on the scene indispensable, and Gough was appointed commander-in-chief of the British forces in China. After the conclusion of the treaty of Nanking in August, 1842, the British forces were withdrawn; and before the close of the year Gough was created a baronet, and was invested with the grand cross of the Bath. He also received the thanks of both houses of parliament. Returning to India, he was appointed (August, 1843,) commander-in-chief of the British forces in India. In December, 1843, he took the command in person against the Mahrattas, and defeated them at Maharajpore, capturing more than fifty guns. He defeated them again at Punniar, and peace was then concluded at Gwalior. In 1845 occurred the rupture with the Sikhs, who crossed the Sutlej in large numbers, and Sir Hugh Gough conducted the operations against them. In this campaign he was well supported by Lord Hardinge, the governor-general, who had been his comrade in the Peninsula, and now volunteered to serve under him. The Sikhs were defeated in three great battles in rapid succession—at Moodkee, Ferozeshah, and Sobraon—and submitted to make peace soon after at Lahore. The services of Sir Hugh Gough on these occasions were rewarded by a vote of thanks from both houses of parliament, and by his elevation to the peerage of the United Kingdom as Baron Gough (April, 1846). The war broke out again in 1848, and again Lord Gough took the field. With unabated energy he defeated the Sikhs at Ramnuggar, and at Chillianwallah, and finally broke their power by his decisive victory at Gujrat (February, 1849). He died near Dublin, March 2, 1869.

GOUGH, RICHARD, an English antiquary, the son of a wealthy East India director, was born in London, October 1, 1735. In 1752 he entered Benet College, Cambridge, where his taste for antiquarian research received additional impulse, and where he commenced his work on British topography, which was published in 1768. After leaving Cambridge in 1756, he began a series of antiquarian excursions in various parts of Great Britain, the fruit of which was seen in the volumes which he subsequently published. He became F.R.S. in 1775, and died in 1809.

GOUJET, CLAUDE PIERRE, a French abbé and litterateur, was born at Paris, October 19, 1697. As he received little remuneration for his writings, he came to be in circumstances of great poverty, and was compelled to sell his library, a sacrifice which hastened his death, which took place at Paris, February 1, 1767.

GOUJON, JEAN, was the most distinguished sculptor produced by France during the sixteenth century. Although some evidence has been offered in favor of the date 1520, the time and place of his birth are still uncertain. The first mention of his name occurs in the accounts of the church of St. Maclou, at Rouen, in the

year 1540, and in the following year he was employed at the cathedral of the same town, where he added to the tomb of Cardinal d'Amboise a statue of his nephew Georges, afterward removed. On leaving Rouen, Goujon was employed by Pierre Lescot, the celebrated architect of the Louvre, on the restorations of St. Germain l'Auxerrois. In 1547 appeared Martin's French translation of *Vitruvius*, the illustrations of which were due, the translator tells us in his *Dedication to the King*, to Goujon. We learn from this statement, not only that Goujon had been taken into the royal service on the accession of Henry II., but also that he had been previously employed under Bullant on the chateau of Écouen. At the Louvre, Goujon, under the direction of Lescot, executed the carvings of the southwest angle of the court, the reliefs of the *Escalier Henri II.*, and the *Tribune des Caryatides*. About a year before the execution of the *Caryatides*, for which Goujon received 737 livres on September 5, 1550, he produced, according to unbroken tradition, the reliefs of the Fontaine des Innocents. In 1555, his name appears again in the Louvre accounts, and continues to do so every succeeding year up to 1561, when all trace of him is lost. In the course of this year an attempt was made to turn out of the royal employment all those who were suspected of Huguenot tendencies. Goujon has always been claimed as a reformer; it is consequently possible that he was one of the victims of this attack. His death is said to have taken place during the St. Bartholomew massacre in 1572.

GOULD, AUGUSTUS ADDISON, American conchologist, was born at New Ipswich, N. H., April 23, 1805, graduated at Harvard College in 1825, and took his degree of doctor of medicine in 1830. Establishing himself in Boston, he devoted himself to the practice of medicine, and finally rose to high professional rank and social position. He became president of the Massachusetts Medical Society, and was employed as authority in editing the vital statistics of the State. As a conchologist his reputation is world-wide. He was a pioneer of the science in America. His writings fill many pages of the publications of the Boston Society of Natural History and other periodicals. The two most important monuments to his scientific work, however, are *The Mollusks and Shells of the United States* exploring expedition under Commodore Wilkes, published by the government, and the *Report on the Invertebrata*, published in 1841. The author's death took place at Boston, September 18, 1866.

GOURD, a name given to various plants belonging to the genus *Cucurbita*, monœcious trailing herbs of annual duration, with long succulent stems furnished with tendrils, and large, rough, palmately-lobed leaves; the flowers, reticulated with veins, are generally large and of a bright yellow or orange color, the barren ones with the stamens united; the fertile are followed by the large, succulent fruit that gives the gourds their chief economic value. Many varieties of *Cucurbita* are under cultivation in tropical and temperate climates, especially in southern Asia; but it is extremely difficult to refer them to definite specific groups, on account of the facility with which they hybridize; while it is very doubtful whether any of the original forms now exist in the wild state.

GOURGAUD, GASPARD, BARON, a French general of artillery, was born at Versailles, September 14, 1783. After studying at the polytechnic school and at the artillery school of Châlons, he joined the artillery in 1802, acquitted himself with distinction in several campaigns and received in 1807 the cross of honor and the grade of captain. He served in the subsequent Spanish and Austrian campaigns, and in 1811 he was sent to report on the strength of the fortifications of



Dantzic, a mission that he fulfilled so much to the satisfaction of Napoleon that he was named one of the emperor's ordnance officers. During the Russian campaign he was the first to enter the Kremlin at Moscow, where he removed the match from a large quantity of powder the explosion of which would in all probability have destroyed the emperor's life. For this service he received the title of baron. He accompanied the emperor in his subsequent campaigns, and in 1814, at the battle of Brienne, was again successful in delivering him from imminent peril. After the accession of Louis XVIII. he was named chief of the staff of the first artillery division, but on the return of Napoleon from Elba he was nevertheless named by him adjutant and general, and took part in the battle of Waterloo. Being one of the three French officers chosen by Napoleon to accompany him to St. Helena, he was employed there in collecting materials for a history of Napoleon's campaigns, but on account of some misunderstanding with Montholon, he left the island, and went to England. He published in 1818 *La Campagne de 1815*, and he also endeavored to interest the emperors of Russia and Austria in Napoleon's behalf. Shortly afterward he was expelled from England as a spy of Napoleon's. Returning to France in 1821, he published, along with Montholon, in 1823, *Mémoires de Napoléon à Sainte-Hélène*. In 1827, he became involved in a controversy with Sir Walter Scott regarding some statements made by the latter in his life of Napoleon. After the July revolution of 1830, Gourgaud was appointed to the command of the artillery of Paris and Vincennes; in 1832 he was named aid-de-camp of the king, and in 1835 lieutenant-general. In 1840 he was one of the commissioners sent to bring the remains of Napoleon to France. On the occurrence of the revolution of February, 1848, his name was struck off the list of generals, but after the events of the following June he was chosen colonel of the first legion of the national guard of Paris. In 1849 he was elected representative of the legislative assembly for the department of Deux-Sèvres. He died July 25, 1852.

GOUT, a specific constitutional disorder connected with excess of uric acid in the blood, and manifesting itself by inflammation of joints, with deposition therein of urate of soda, and also by morbid changes in various important organs. The term gout, which was first used about the end of the thirteenth century, is derived through the French *goutte* from the Latin *gutta*, a drop, in allusion to the old pathological doctrine of the dropping of a morbid material from the blood within the joints. The disease was known and described by the ancient Greek physicians under various terms, which, however, appear to have been applied by them alike to rheumatism and gout.

Hippocrates in his *Aphorisms* speaks of gout as occurring most commonly in spring and autumn, and mentions the fact that women are less liable to it than men. He also gives directions as to treatment. Celsus gives a similar account of the disease. Galen regarded gout as an unnatural accumulation of humors in a part, and the chalkstones as the concretions of these, and he attributed the disease to over-indulgence and luxury. Gout is alluded to in the works of Ovid and Pliny, and Seneca in his ninety-fifth epistle mentions the prevalence of gout among the Roman ladies of his day as one of the results of their high-living and debauchery.

It is often stated that the attack of gout comes on without any previous warning; but, while this is true in many instances, the reverse is probably as frequently the case, and the premonitory symptoms, especially in those who have previously suffered from the disease, may

be sufficiently precise to indicate the impending seizure. Among the more common of these may be mentioned marked disorders of the digestive organs, with a feeble and capricious appetite, flatulence and pain after eating, and uneasiness in the right side in the region of the liver. When the affected part is examined it is found to be swollen and of a deep red hue. The superjacent skin is tense and glistening, and the surrounding veins are more or less distended. After a few hours there is a remission of the pain, slight perspiration takes place, and the patient may fall asleep. The pain may continue moderate during the day but returns as night advances, and the patient goes through a similar experience of suffering to that of the previous night, followed with a like abatement toward morning. These nocturnal exacerbations occur with greater or less severity during the continuance of the attack, which generally lasts for a week or ten days. As the symptoms decline the swelling and tenderness of the affected joint abate, but the skin over it pits on pressure for a time, and with this there is often associated slight desquamation of the cuticle. During the attacks there is much constitutional disturbance. The patient is restless and extremely irritable, and suffers from cramp in the limbs and from dyspepsia, thirst, and constipation. The urine is scanty and high-colored, with a copious deposit, consisting chiefly of urates. During the continuance of the symptoms the inflammation may leave the one foot and affect the other, or both may suffer at the same time. After the attack is over the patient feels quite well and fancies himself better than he had been for a long time before; hence the once popular notion that a fit of the gout was capable of removing all other ailments. Any such idea, however, is sadly belied in the experience of most sufferers from this disease.

Attacks of gout are readily excited in those predisposed to the disease. Exposure to cold, disorders of digestion, fatigue, and irritation or injuries of particular joints will often precipitate the gouty paroxysm.

With respect to the treatment of gout the greatest variety of opinion has prevailed and practice been pursued. The general plan of treatment can be here only briefly indicated. During the acute attack the affected part should be kept at perfect rest, and have applied to it warm opiate fomentations or poultices, or, what answers fully better, be enveloped in cotton-wool covered in with oil silk. The diet of the patient should be light, without animal food or stimulants. The administration of some simple laxative will be of service, as well as the free use of alkaline diuretics, such as the bicarbonate or acetate of potash. The medicinal agent most to be relied on in the treatment of gout is colchicum, which manifestly exercises a powerful action on the disease. This drug (*Colchicum autumnale*), which is believed to correspond to the hermodactyl of the ancients, was introduced as a remedy for gout about a century ago, and has proved of such efficacy in modifying the attacks that, as observed by Doctor Garrod, "we may safely assert that colchicum possesses as specific a control over the gouty inflammation as cinchona barks or their alkaloids over intermittent fever." The mode of action of colchicum in gout is by no means determined, since it would appear to have no certain effect upon the uric acid excreted from the system; and the general opinion seems to be that this drug has a special sedative effect on the gouty inflammation. It is usually administered in the form of the wine in doses of 5-15 drops every four or six hours, or in pill as the acetous extract (gr.  $\frac{1}{4}$ -gr.  $\frac{1}{2}$ ). Of late years, colchicum, in combination with iodide of potassium, has been much used in chronic gout, and as an eliminative of uric acid no agent surpasses lemon juice. Lithia, and the various mineral



waters holding that substance in solution, are recommended by eminent authorities.

The treatment and regimen to be employed in the intervals of the gouty attacks are of the highest importance. These bear reference, for the most part, to the habits and mode of life of the patient. Restriction must be laid upon the amount and quality of the food, and equally, or still more, upon the alcoholic stimulants. By those most advanced in life, who, from long-continued habit, are unable entirely to relinquish the use of stimulants, the strictest possible temperance must be observed. Regular, but moderate exercise, in the form of walking or riding, in the case of those who lead sedentary lives, is of great advantage; and all over-work, either physical or mental, should be avoided. The effect upon the gouty constitution of certain mineral waters and baths is well known. The particular place must, in each case, be determined by the physician; and special caution must be observed in recommending this plan of treatment in persons whose gout is complicated by organic diseases of any kind.

GOUVION SAINT CYR, LAURENT, MARQUIS DE, a French marshal, was born at Toul, April 13, 1764. At the age of eighteen he went to Rome with the view of prosecuting the study of painting, but, although he continued his artistic studies after his return to Paris in 1784, he never definitely adopted the profession of a painter. In 1792 he was chosen a captain in the *chasseurs républicains*, and served on the staff of General Custine. His promotion rapidly followed, and in the course of two years he had become a general of division. In 1796 he commanded the center division of Moreau's army in the campaign of the Rhine, and by coolness and sagacity greatly aided him in his brilliant defense against superior numbers, and in his subsequent celebrated retreat. In 1798 he was appointed to the command of the army of Italy, the officers of which had revolted against their general Massena, and he was speedily successful in obtaining the complete reestablishment of discipline. In the following year he commanded the left wing of Jourdan's army in Germany; but when Jourdan was succeeded by Massena, he joined the army of Moreau, in Italy, where, in face of great difficulties, he was not only completely successful in his defensive tactics, but gained, on December 13th, an important victory at Albano. When Moreau, in 1800, was appointed to the command of the army of the Rhine, Gouvion St. Cyr was named his first lieutenant, and on May 9th gained a victory over General Kray at Biberach. In 1801 he was sent to Spain to command the army intended for the invasion of Portugal, and was named grand officer of the legion of honor. When a treaty of peace was shortly afterward concluded with Portugal, he succeeded Lucien Bonaparte as ambassador at Madrid. In 1803 he was appointed to the command of an army corps in Italy, and he gained in 1805 a victory over the Austrians at Castel Franco. He took part in the Prussian and Polish campaigns of 1807, and in 1808 he commanded an army corps with some success in Catalonia; but, not wishing to comply with certain orders he received from Paris, he resigned his command and remained in disgrace till 1811. On the opening of the Russian campaign he received command of the sixth army corps, and on August 7, 1812, obtained a victory over the Russians at Polosk, in recognition of which he was created a marshal of France. He distinguished himself at the battle of Dresden, August 26 and 27, 1813, but, after a stubborn resistance, capitulated there to the allies on November 11th following, and remained for some time a prisoner in Hungary. On the restoration of the Bourbons he was created a peer in France, and in July, 1815, was appointed war minister, but resigned

his office in the November following. In June, 1817, he was appointed minister of marine, and in September following again resumed the duties of war minister, which he continued to discharge till November, 1819. He died March 17, 1830.

GOVERNMENT. Without attempting to discriminate by verbal definitions the various shades of meaning which this word assumes, we shall use it in this article in its widest sense—that of the ruling power in a political society. The conception of society which this use of the word implies may be illustrated by two well-known theories.

In John Austin's celebrated analysis of law, the first step is the proposition that a law is a command issued by a superior to a subject and enforced by a sanction or penalty. The laws of God, with reference to the conduct of men, the laws of a private club or association of men with reference to the conduct of its members, and the laws of a political society, are all, according to Austin's definition, laws properly so called. The laws of nature are laws not properly so called. They are generalizations as to the uniform course of nature, and have no analogy to laws properly so called except in point of uniformity. Positive law, again, is distinguished from other laws, properly so called, as the command of the sovereign of an independent political community. A sovereign is a person, or a determinate body of persons, to whom the bulk of the community is habitually obedient. Every word in this definition has its precise meaning, which is developed by Austin with admirable clearness. The faculty "of untying knots" on which he prided himself is nowhere more conspicuously manifested than in the analysis which lays bare the real meaning of the common phrases used to describe the fundamental parts of society. It is not our purpose to examine the value of this analysis here, but simply to call attention to the assumption that in every society of men there is a determinate body (whether consisting of one individual, or a few or many individuals) whose commands the rest of the community obey. This sovereign body is what in more popular phrase is termed the Government of the country, and the varieties which may exist in its constitution are known as forms of government.

Mr. Herbert Spencer, approaching the study of society under the influence of conceptions derived from the study of physical organisms, brings us to very much the same result. The union of men in society is itself an organic structure, having parts and functions corresponding to the parts and functions of an animal or a plant. Mr. Spencer pursues this analogy so fully and minutely as to leave the impression that he believes it to be something more than an analogy,—that it is a general law from which true deductions regarding society may be drawn. The veins and arteries correspond to our railroads and highways; the nerves, communicating intelligence to the brain, are paralleled by the telegraph wires; the centralized action of society at the seat of government is the same thing as the regulative activity of the brain. Government is here represented by the regulative functions of a living organism, and forms of government are so many varieties in the structure. Austin, for the purposes of jurisprudence, finds it convenient to regard society as molded by the will of a dominant body. Spencer exhibits the regulative parts of society as bound up with the rest in one organism. With both the existence of a government is necessary to the conception of society. In the one theory the element of command, in the other that of regulation, is conspicuous. If to these we add a third, that of simple agency, we shall have a tolerably complete view of the relations between Government



and society. Besides commanding the conduct of individuals, besides regulating the relations of the various members of society, Government may be conceived of as merely the instrument of society. Where men are united in groups there arises from their union the necessity of action on behalf of the group. That part of society which attends to the business of the whole is the Government.

Two main lines of inquiry divide the subject. The first relates to varieties in the structure of the governing body—forms of government. The second relates to the functions of the governing body, the sphere of government, the things which fall within the province of state action. In both lines we have to deal with the ascertained facts of the past history and present condition of human societies. In both we have also to notice the speculative opinions of political thinkers. Notwithstanding the apparent confusion it will probably be found more convenient not to separate the historical from the speculative treatment of the subject. What is the best form of government?—is not quite the same question as what was the constitution of Athens or Rome? What are the proper limits of state interference?—is not the same question as what are the functions of the state in France or England? And yet the same answer may often serve for both sets of questions. Ideal constitutions have a suspicious resemblance to the constitutions with which their authors are most familiar. The political speculations of Plato and of Cicero are based on the state systems of Greece and Italy. Cicero's ideal code in the treatise *De Legibus* is simply an adaption of the Twelve Tables. On the other hand, the form of political speculation is often determined by, and in turn determines the practical politics of the time. The intimate connection between speculation and practice in politics is strikingly illustrated in the period of controversy which culminated in the Revolution of 1688. The irreconcilable claims of crown and parliament threw the mind back on first principles. Never had theorists a better chance. Popular government and absolute government each sought to establish itself on a basis of reason and nature.

*Origin of Government.*—A preliminary question, formerly of vast theoretical importance would be, What is the origin of government? How did government come into existence? As a question of historical fact, it demands for its solution a knowledge of the whole past of the human race. It has been answered over and over again in times when historical knowledge could hardly be said to exist, and it has, therefore, been answered without any reference to history. The answers which have satisfied the minds of men may be distinguished broadly into three classes. The first class would comprehend the legendary accounts which nations have given in primitive times of their own forms of government. These are always attributed to the mind of a single lawgiver. The government of Sparta was the invention of Lycurgus. Solon, Moses, Numa and Alfred in like manner shaped the government of their respective nations. The second may be called the logical or metaphysical account of the origin of government. It contained no overt reference to any particular form of government, whatever its covert references may have been. It answered the question, How government in general came into existence; and it answered it by a logical analysis of the elements of society. The phenomenon to be accounted for being government and laws, it abstracted government and laws, and contemplated mankind as existing without them. The characteristic feature of this kind of speculation is that it reflects how contemporary men would behave if all government were removed, and infers that men must have behaved so be-

fore government came into existence. Society without government resolves itself into a number of individuals, each following his own aims, and, therefore, in the days before government, each man followed his own aims. It is easy to see how this kind of reasoning should lead to very different views of the nature of the supposed original state.

The "social compact" is the most famous of the metaphysical explanations of government. It has had the largest history, the widest influence, and the most complete development. To the same class belong the various forms of the theory that governments exist by divine appointment. Of all that has been written about the divine right of kings, a great deal must be set down to the mere flatteries of courtiers and ecclesiastics. But there remains a genuine belief that men are bound to obey their rulers because their rulers have been appointed by God. Like the social compact, the theory of divine appointment avoided the question of historical fact.

The application of the historical method to the phenomena of society has changed the aspect of the question and robbed it of its political interest. The student of the history of society has no formula to express the law by which government is born. All that he can do is to trace governmental forms through various stages of social development. The more complex and the larger the society, the more distinct is the separation between the governing part and the rest, and the more elaborate is the subdivision of functions in the government. The primitive type of ruler is king, judge, priest, and general. At the same time, his way of life differs little from that of his followers and subjects. The metaphysical theories were so far right in imputing greater equality of social conditions to more primitive times. Increase of bulk brings with it a more complex social organization. War tends to develop the strength of the governmental organization; peace relaxes it. All societies of men exhibit the germs of government; but there would appear to be races of men so low that they cannot be said to live together in society at all. Recent investigations have illustrated very fully the importance of the family in primitive societies, and the belief in a common descent has much to do with the social cohesion of a tribe. The government of a tribe resembles the government of a household; the head of the family is the ruler. But we cannot affirm that political government has its origin in family government, or that there may not have been states of society in which government of some sort existed while the family did not.

Political writers from the time of Aristotle have been singularly unanimous in their classification of the forms of government. There are three ways in which states may be governed. They may be governed by one man, or by a number of men, small in proportion to the whole number of men in the state, or by a number large in proportion to the whole number of men in the state. The government may be a monarchy, an aristocracy, or a democracy.

Aristotle divides governments according to two principles. In all states the governing power seeks either its own advantage or the advantage of the whole state, and the government is bad or good accordingly. In all states the governing power is one man, or a few men, or many men. Hence six varieties of government, three of which are bad and three good. Each excellent form has a corresponding depraved form, thus:

The good government of one (Monarchy) corresponds to the depraved form (Tyranny).

The good government of few (Aristocracy) corresponds to the depraved form (Oligarchy).



The good government of many (Commonwealth) corresponds to the depraved form (Democracy).

The fault of the depraved forms is that the governors act unjustly where their own interests are concerned. The worst of the depraved forms is tyranny, the next oligarchy, and the least bad democracy. Each of the three leading types exhibits a number of varieties. Thus in monarchy we have the heroic, the barbaric, the elective dictatorship, the Lacedæmonian, and absolute monarchy. So democracy and oligarchy exhibit four corresponding varieties. The best type of democracy is that of a community mainly agricultural, whose citizens, therefore, have not leisure for political affairs, and allow the law to rule. The best oligarchy is that in which a considerable number of small proprietors have the power; here, too, the laws prevail. The worst democracy consists of a larger citizen class having leisure for politics; and the worst oligarchy is that of a small number of very rich and influential men. In both the sphere of law is reduced to a minimum. A good government is one in which as much as possible is left to the laws, and as little as possible to the will of the governor.

The *Politics* of Aristotle, from which these principles are taken, presents a striking picture of the variety and activity of political life in the free communities of Greece. The king and council of heroic times had disappeared, and self-government in some form or other was the general rule. It is to be noticed, however, that the governments of Greece were essentially unstable. The political philosophers could lay down the law of development by which one form of government gives birth to another. Aristotle devotes a large portion of his work to the consideration of the causes of revolutions. The dread of tyranny was kept alive by the facility with which an over-powerful and unscrupulous citizen could seize the whole machinery of government. Communities oscillated between some form of oligarchy and some form of democracy. The security of each was constantly imperiled by the conspiracies of the opposing factions. Hence, although political life exhibits that exuberant variety of form and expression which characterizes all the intellectual products of Greece, it lacks the quality of persistent progress. Then there was no approximation to a national government, even of the federal type. The varying confederacies and hegemonies are the nearest approach to anything of the kind.

In Rome each citizen had a right to vote laws in his own person in the comitia of the centuries or the tribes. The administrative powers of government were, however, in the hands of a bureaucratic assembly, recruited from the holders of high public office. The senate represented capacity and experience rather than rank and wealth. Without some such instrument the city government of Rome could never have made the conquest of the world. The gradual extension of the citizenship to other Italians changed the character of Roman government. The distant citizens could not come to the voting booths; the device of representation was not discovered; and the comitia fell into the power of the town voters. In the last stage of the Roman republic, the inhabitants of one town wielded the resources of a world-wide empire. We can imagine what would be the effect of leaving to the people of London or Paris the supreme control of the British empire or of France—irresistible temptation, inevitable corruption. The rabble of the capital learn to live on the rest of the empire.

The Roman empire bequeathed to modern Europe the theory of universal dominion. The nationalities which grew up after its fall arranged themselves on the

basis of territorial sovereignty. Leaving out of account the free municipalities of the Middle Ages, the problem of government had now to be solved, not for small urban communities, but for large territorial nations. The mediæval form of government was feudal. One common type pervaded all the relations of life. The relation of king and lord was like the relation between lord and vassal. The bond between them was the tenure of land.

The connection between representation and the feudal system of estates must be shortly noticed. The feudal theory gave the king a limited right to military service and to certain aids, both of which were utterly inadequate to meet the expenses of the government, especially in time of war. The king therefore had to get contributions from his people, and he consulted them in their respective orders.

*The English System.*—The right of the commons to share the power of the king and lords in legislation, the exclusive right of the commons to impose taxes, the disappearance of the clergy as a separate order, were all important steps in the movement toward popular government. The extinction of the old feudal nobility in the dynastic wars of the fifteenth century simplified the question by leaving the crown face to face with parliament. The immediate result was, no doubt, an increase in the power of the crown, which probably never stood higher than it did in the reigns of Henry VIII. and Elizabeth, but even these powerful monarchs were studious in their regard for parliamentary conventionalities. After a long period of speculative controversy and civil war, the settlement of 1688 established limited monarchy as the government of England. Since that time the external form of government has remained unchanged, and, so far as legal description goes, the constitution of William III. might be taken for the same system as that which still exists. The silent changes have, however, been enormous. The most striking of these, and that which has produced the most salient features of the English system, is the growth of cabinet government. Intimately connected with this is the rise of the two great historical parties of English politics. The normal state of government in England is that the cabinet of the day shall represent that which is, for the time, the stronger of the two. Before the Revolution the king's ministers had begun to act as a united body, but, even after the Revolution, the union was still feeble and fluctuating, and each individual minister was bound to the others only by the tie of common service to the king. Under the Hanoverian sovereigns the ministry became consolidated, the position of the cabinet became definite, and its dependence on parliament, and more particularly on the House of Commons, was established. Ministers were chosen exclusively from one house or the other, and they assumed complete responsibility for every act done in the name of the crown. The simplicity of English politics has divided parliament into two nearly equal parties, and the party in opposition has been steadied by the consciousness that it, too, has constitutional functions of high importance. Criticism is sobered by being made responsible. Along with this movement went the withdrawal of the personal action of the monarch in politics. No king has attempted to veto a bill since the Scotch Military Bill was vetoed by Queen Anne. No ministry has been dismissed by the sovereign since 1834. Whatever the power of the monarch may be, it is unquestionably limited to his personal influence over his ministers. And it must be remembered that ministers are responsible ultimately, not to parliament, but to the House of Commons.

Apart, therefore, from the democratic changes of



1832 and 1867, we find that the House of Commons, as a body, had gradually made itself the center of the government. Since the area of the constitution has been enlarged, it may be doubted whether the orthodox descriptions of the government any longer apply.

The parliamentary government developed by England out of feudal materials has been deliberately accepted as the type of constitutional government all over the world. Nearly all the European States and nearly all the European colonies, dependent or independent, have adopted, more or less fully, the leading features of the English system — that is to say, popular representation more or less extensive, a bicameral legislature, and a cabinet or consolidated ministry. In connection with all of these, numberless questions of the highest practical importance have arisen, the bare enumeration of which would surpass the limits of our space.

*The Two Chambers.*—First, as to the double chamber. This, which is perhaps more accidental than any other portion of the English system, has been the most widely imitated. In most European countries, in the English colonies, in the United States congress, and in the separate States of the Union, there are two houses of legislature. This result has been brought about partly by natural imitation of the accepted type of free government, partly from a conviction that the second chamber will moderate the democratic tendencies of the first. The theoretical question would take too long to argue, but it is easy to show that the elements of the English original cannot be reproduced to order under different conditions. There have, indeed, been a few attempts to imitate the special character of hereditary nobility attaching to the English House of Lords, and these few have failed. The complete solidarity existing between the English nobility and at least the politically privileged, if not the whole mass, of their countrymen, is a result not to be attempted by the framers of constitutions. The English system, too, after its own way, obviates any danger of collision between the Houses,—the standing and obvious danger of the bicameral system. In England there is no doubt where the real sovereignty lies. The actual ministers of the day must possess the confidence of the House of Commons; they need not—in fact, they often do not—possess the confidence of the House of Lords. It is only in legislation that the Lower House really shares its power with the Upper; and the constitution possesses, in the unlimited power of nominating peers, a well-understood last resource should the House of Lords persist in refusing important measures demanded by the representatives of the people. In all but measures of first-class importance, however, the House of Lords is a real second chamber, and in these there is little danger of a collision between the Houses. There is the widest possible difference between the English and any other second chamber. In the United States the Senate (constituted on the system of equal representation of States, the members of which are elected by State legislatures—each State, irrespective of size or population, being entitled to two senators) is the more important of the two Houses, and the only one whose control of the executive can be compared to that exercised by the British House of Commons. In the English colonies a dead-lock between the two Houses is a matter of frequent occurrence. In France it is an anticipated if not an intended source of danger to the new republican constitution.

The real strength of popular government in England lies in the ultimate supremacy of the House of Commons. That supremacy had been acquired, perhaps to its full extent, before the extension of the suffrage made the constituencies democratic. Foreign imitators,

it may be observed, have been more ready to accept a wide basis of representation than to confer real power on the representative body. In all the monarchical countries of Europe, however unrestricted the right of suffrage may be, the real victory of constitutional government has yet to be won. Where the suffrage means little or nothing, there is little or no reason for guarding it against abuse. The independence of the executive in the United States brings that country, from one point of view, more near to the Continental than to the English state system. The people make a more complete surrender of power to the government than is done in England.

*Cabinet Government.*—The peculiar functions of the English cabinet are not easily matched in any foreign system. They are a mystery even to most educated Englishmen. The cabinet in England is much more than a body consisting of chiefs of departments. It is the inner council of the empire, the arbiter of national policy, foreign or domestic, the sovereign in commission. The whole power of the House of Commons is concentrated in its hands. At the same time, it has no place whatever in the legal constitution. Its numbers and its constitution are not fixed even by any rule of practice. It keeps no record of its proceedings. The relations of an individual minister to the cabinet, and of the cabinet to its head and creator, the premier, are things known only to the initiated. With the doubtful exception of France, no other system of government presents us with anything like its equivalent. In the United States, as in the European monarchies, we have a council of ministers surrounding the chief of the state.

One of the most difficult problems of government is how to provide for the devolution of political power, and perhaps no other question is so generally and justly applied as the test of a working constitution. If the transmission works smoothly, the constitution, whatever may be its other defects, may at least be pronounced stable. It would be tedious to enumerate all the contrivances which this problem has suggested to political societies. Here, as usual, Oriental despotism stands at the bottom of the scale. When sovereign power is imputed to one family, and the law of succession fails to designate exclusively the individual entitled to succeed, assassination becomes almost a necessary measure of precaution. The prince whom chance or intrigue has promoted to the throne of a father or an uncle, must make himself safe from his relatives and competitors.

*Change of Power in the United States.*—The United States offers a very different solution of the problem. The American president is at once king and prime minister; and there is no titular superior to act as a conduit-pipe between him and his successor. His crown is rigidly fixed; unshakable for four years (except in rare cases by the extreme measure of impeachment), after four years he ceases to reign. No hostile vote can affect his power as the head of the administration, and it is difficult to resist his will even in legislation. But the day of his demise is known from the first day of his government; and almost before he begins to reign the political forces of the country are shaping out a new struggle for the succession. Further, a change of government in America means a change of the entire administrative staff. The commotion caused by a presidential election in the United States is thus infinitely greater than that caused by a general election in England. A change of power in England affects comparatively few personal interests, and absorbs the attention of the country for a comparatively short space of time. In the United States it is long foreseen and elaborately prepared for,



and when it comes it involves the personal fortunes of large numbers of citizens. And yet the English constitution is more democratic than the American, in the sense that the popular will can more speedily be brought to bear upon the government.

*State Government.*—In the various States of the American Union the chief executive, or governor, occupies about the same position with regard to the legislature that the president does to congress. He is elected, as are in most cases several of the higher State officials, by the popular vote. He possesses, in nearly all cases, the pardoning power, and has a veto, which can be overcome by a two-thirds majority in both Houses. He is commander-in-chief of the State army and navy, and, upon the call of a sheriff, can order the State troops to suppress riot or insurrection. With him also rests the responsibility of calling on the federal executive for assistance in case of invasion; and without his permission no federal troops can be sent within the bounds of the State, except to garrison forts, arsenals, etc., belonging to the general government. He has also the appointment of United States senators and judges to fill vacancies, pending the action of the legislature, and he appoints members of State boards, and nominates notaries public. In most instances his nominations require confirmation by the Senate. Their terms of office vary in the different States.

*Change of Power in France.*—The established practice of England and America may be compared with the nascent constitutionalism of France. Here the problem presents different conditions. The head of the state is neither a premier of the English, nor a president of the American type. He is served by a prime minister and a cabinet, who, like an English ministry, hold office on the condition of parliamentary confidence; but he holds office himself on the same terms, and is, in fact, a minister like the others. So far as the transmission of power from cabinet to cabinet is concerned, he discharges the functions of an English king. But the transmission of power between himself and his successor is protected by no constitutional devices whatever, and recent experience would seem to show that no such devices are really necessary. As to the practice in France, this much seems clear: Some rearrangement of the relations of the president and the cabinet must soon take place. It seems difficult to distinguish between a parliamentary president and a parliamentary ministry, or to see why they should not stand or fall together. Possibly the existence of numerous political parties, and the open disloyalty to the existing constitution professed by some of them, may retard the simplification of the French governmental system. Other European countries professing constitutional government appear to follow the English practice. The Swiss republic is so peculiarly situated that it is hardly fair to compare it with any other. But it is interesting to note that, while the rulers of the states are elected annually, the same persons are generally reelected.

*Representation.*—The questions connected with representation are too numerous to be discussed with advantage here. Two recent changes of great importance may be noticed in the English system—the vote by ballot, and the partial introduction of what is called the minority vote. By the latter, in a constituency returning three members, each elector has only two votes, and a minority exceeding one-third can thus elect at least one of the three.

*Recapitulation.*—What is the appropriate sphere of government? What kind of business does it undertake, and what kind of business ought it to undertake? By what limits is its action to be restricted? Here too the field is occupied by disputed theories and diversified

practice. And the sphere assigned to state action in different ages and countries varies as widely as the form of government.

The action of the state, or sovereign power, or government in a civilized community shapes itself into the three-fold functions of legislation, judicature, and administration. The two first are perfectly well defined, and the last includes all the kinds of state action not included in the other two. It is with reference to legislation and administration that the line of permissible state-action requires to be drawn. There is no doubt about the province of the judicature, and that function of government may therefore be dismissed with a very few observations.

The complete separation of the three functions marks a high point of social organization. In simple societies the same officers discharge all the duties which we divide between the legislator, the administrator, and the judge. The acts themselves are not consciously recognized as being of different kinds. The evolution of all the parts of a highly complex government from one original is illustrated in a striking way by the history of English institutions. All the conspicuous parts of the modern government, however little they may resemble each other now, can be followed back without a break to their common origin. Parliament, the cabinet, the privy council, the courts of law, all carry us back to the same *nidus* in the council of the feudal king.

The business of judicature, requiring as it does the possession of a high degree of technical skill and knowledge, is generally intrusted by the sovereign body or people to a separate and independent class of functionaries. In England, the appellate jurisdiction of the House of Lords still maintains in theory the connection between the supreme legislative and the supreme judicial functions. It is only recently that the important subject of divorce passed from the legislative chambers to the courts of law, a condition of things yet existing in some of the United States. In some of the States of the American Union the judicial functions of the upper house are still maintained after the example of the English constitution as it existed when these States were founded. In England there is also still a considerable amount of judicial work in which the people takes its share. The inferior magistracies, except in populous places, are in the hands of private persons. And by the jury system the ascertainment of fact has been committed in very large measure to persons selected indiscriminately from the mass of the people, subject to a small property qualification. But the higher functions of the judicature are exercised by persons whom the law has jealously fenced off from external interference and control. The independence of the bench distinguishes the English system from every other. It was established in principle as a barrier against monarchical power, and hence has become one of the traditional ensigns of popular government. In many of the American States the spirit of democracy has demanded the subjection of the judiciary to popular control. The judges are elected directly by the people, and hold office for a short term, instead of being appointed, as in England, by the responsible executive, and removable only by a vote of the two Houses. In other States the judges of the courts, above the grade of local magistrates, are elected either by the legislature, or, if police judges, by the municipal councils. There is not the smallest sign that democratic opinion in England is tending in this direction. At the same time the constitution of the United States has assigned to the supreme court of the Union a perfectly unique position, standing in singular contrast to the depraved condition of many of the State judicatories. The supreme court is the guardian of the constitution.



It has to judge whether a measure passed by the legislative powers is or is not void by reason of being unconstitutional, and it may therefore have to veto the deliberate resolutions of both Houses of Congress and the president. It is admitted that this singular experiment in government has been completely justified by its success.

The question of the limits of state action does not arise with reference to the judiciary. The enforcement of the laws is a duty which the sovereign power must of absolute necessity take upon itself. But to what conduct of the citizens the laws shall extend is the most perplexing of all political questions. The correlative question with regard to the executive would be what works of public convenience should the state undertake through its own servants. The whole question of the sphere of government may be stated in these two questions: What should the state do for its citizens? and how far should the state interfere with the action of its citizens? These questions are the direct outcome of modern popular government; they are equally unknown to the small democracies of ancient times and to despotic governments at all times. Accordingly ancient political philosophy, rich as it is in all kinds of suggestions, has very little to say that has any bearing on the sphere of government. The conception that the power of the state can be and ought to be limited belongs to the times of "government by discussion," to use Mr. Bagehot's expression, to the time when the sovereign number is divided by class interests, and when the action of the majority has to be carried out in the face of strong minorities, capable of making themselves heard. Aristotle does indeed dwell on one aspect of the question. He would limit the action of the government in the sense of leaving as little as possible to the personal will of the governors, whether one or many. His maxim is that the law should reign. But that the sphere of law itself should be restricted, otherwise than by general principles of morality, is a consideration wholly foreign to ancient philosophy. The state is conceived as acting like a just man, and justice in the state is the same thing as justice in the individual. The Greek institutions which the philosophers are unanimous in commending, are precisely those which the most state-ridden nations of modern times would agree in repudiating.

A more profitable line of inquiry has been followed by writers of the economical school. The most important of these is John Stuart Mill, whose essay on *Liberty*, together with the concluding chapters of his treatise on *Political Economy*, gives a tolerably complete view of the principles of government. The leaning of political economists is toward what is called the *laissez-faire* or non-interference doctrine. There is a general presumption against the interference of Government, which is only to be overcome by very strong evidence of necessity. Governmental action is generally less effective than voluntary action. The necessary duties of Government are so burdensome, that to increase them destroys its efficiency. Its powers are already so great that individual freedom is constantly in danger. As a general rule, nothing which can be done by the voluntary agency of individuals should be left to the state. Each man is the best judge of his own interests. But, on the other hand, when the thing itself is admitted to be useful or necessary, and it cannot be effected by voluntary agency, or when it is of such a nature that the consumer cannot be considered capable of judging of the quality supplied, then Mr. Mill would allow the state to interpose. Thus the education of children, and even of adults, would fairly come within the province of the state. Mr. Mill even goes so far as to admit that, where a restriction of the hours of labor, or the establishment of a periodical holiday, is proved to be beneficial to laborers as a class,

but cannot be carried out voluntarily on account of the refusal of individuals to coöperate, Government may justifiably compel them to coöperate. Still further, Mr. Mill would desire to see some control exercised by the Government over the operations of those voluntary associations which, consisting of large numbers of shareholders, necessarily leave their affairs in the hands of one or a few persons. In short, Mr. Mill's general rule against state action admits of many important exceptions, founded on no principle less vague than that of public expediency. The essay on *Liberty* is mainly concerned with freedom of individual character, and its arguments apply to control exercised, not only by the state, but by society in the form of public opinion. The leading principle is that of Humboldt, "the absolute and essential importance of human development in its richest diversity." Humboldt broadly excluded education, religion, and morals from the action, direct and indirect, of the state. Mill, as we have seen, conceives education to be within the province of the state, but he would confine its action to compelling parents to educate their children.

The most thoroughgoing opponent of state action, however, is Mr. Herbert Spencer. In his *Social Statics*, published in 1850, he holds it to be the essential duty of government to *protect*—to maintain men's rights to life, to personal liberty, and to property; and the theory that the Government ought to undertake other offices besides that of protector he regards as an untenable theory. Each man has a right to the fullest exercise of all his faculties, compatible with the same right in others. This is the fundamental law of equal freedom, which it is the duty and the only duty of the state to enforce. If the state goes beyond this duty, it becomes, not a protector, but an aggressor. Thus all state regulations of commerce, all religious establishments, all Government relief of the poor, all state systems of education and of sanitary superintendence, even the state currency and the post-office, stand condemned, not only as ineffective for their respective purposes, but as involving violations of man's natural liberty. Many of the principles enunciated in this book are not reconcilable with the later views of the author, but he would still appear to maintain his theory of government to the fullest extent. Thus, in the *Principles of Sociology*, published in 1877, he distinguishes between the militant type of society and the industrial type. The former is framed on the principle of compulsory coöperation, while the latter is framed on the principle of voluntary coöperation. He vaguely indicates "a possible future social type, differing as much from the industrial as this does from the militant—a type which, having a sustaining system more fully developed than any one known at present, will use the products of industry neither for maintaining a militant organization nor exclusively for material aggrandizement, but will devote them to the carrying on of higher activities." Of the two actually existing types, the militant is distinguished by a strong and the industrial by a feeble governmental system. Reversing the analogy suggested by individual organisms, he holds the latter to be a higher and better type than the former. And he maintains that military activity in a state distinguished by a high degree of industrial development produces a recurrence to the militant type of institutions generally. Thus, in Germany, the dealings of Bismarck with the ecclesiastical powers, and the measures taken for centralizing the state control of railways, are instances of a more coercive *régime* established by war. In England, the peaceful period from 1815 to 1850 is contrasted with the militant period since 1850. The latter has been marked by the usurpations of military officialism, by sanitary dictation, by coercive philan-



thropy, by compulsory education, by an unhesitating faith in state judgment, and by a general disregard of the principles of free government, even on the side of the party which in the previous period effected changes in the direction of freedom.

Freedom of contract, in general, has been greatly advanced by the success of the free-trade agitation in 1843, which was not so much a protest against State regulation as a demand for a cheap supply of food. Since that time, the principle that the State should leave men to make what bargains they please, without attempting to encourage any particular industry or to favor any special class, has taken rank as a maxim of universal application.

*Education of Children.*—This is perhaps the most conspicuous, as it is certainly the most beneficial and the least disputed, of the recent encroachments of the State. The progress of opinion and legislation on this subject has been singular and rapid. Beginning with Government grants in aid of education, strenuously resisted on grounds going to the very root of the question of legitimate state interference, the system has now culminated in a net-work of state-supported and state-administered schools spread over the whole country. That the state should compel parents to educate their children would only be a slight departure, if any, from the general principle imposing duties on parents and disabilities on children. Under the present system the state not only compels the parent to educate, but itself provides, and in great measure pays for, the education. A generation of discussion has, however, drawn very distinctly the line beyond which this advance of state authority must not proceed. Compulsory state education is for children only, and may be justified by the general argument which justifies state protection to the helpless; it is elementary only; and it is secular only.

GOWER, JOHN, one of the best of the English minor poets, was born in or about the year 1325. It has been conclusively shown by Sir Harris Nicolas that he belonged to the county of Kent. His family was wealthy; and he seems to have had various country houses. So far as we know he did not marry till 1397, when he was united to Agnes Groundolf. He was an intimate friend of Chaucer; but there is no evidence to prove that they were fellow-students. A few years after his marriage, Gower became blind, and had to give up writing. He spent his declining years in the priory of St. Mary Overies, or, as it is now called, St. Saviour's, in Southwark, where his monument is still to be seen.

Gower's poetical works are four in number—*Balades and Other Poems*, in French, printed in 1818 for the Roxburghe Club; the *Speculum Meditantis*, a treatise on the duties of married life, written in French verse, and divided into ten books; *Vox Clamantis*, a narrative in Latin elegiacs, of the insurrection of the commons in the reign of Richard II.; and the *Confessio Amantis*. The second of these works is believed to have perished; of the third there is a good edition by the Rev. H. O. Coxe, printed for the Roxburghe Club in 1850; and the fourth was first printed by Caxton in 1483. Gower died in 1408.

GOYA, a town of the Argentine Republic, in the province of Corrientes, near the junction of a small stream with the Paraná, about one hundred miles south of Corrientes. Population (1890), 12,000.

GOYANNA, a city of Brazil, in the province of Pernambuco, on a river of its own name, about ten miles from the sea. Population (1890), 12,000.

GOYA Y LUCIENTES, FRANCISCO, Spanish painter, was born in 1746 at Fuendetodos, a small Aragonese village near Saragossa. At an early age he commenced his artistic career under the direction of José

Luzan Martinez, who had studied painting at Naples under Mastroleo. Finding it convenient to retire for a time from Madrid, he decided to visit Rome at his own cost; and being without resources he joined a "quadrilla" of bull-fighters, passing from town to town until he reached the shores of the Mediterranean. In 1772 he was awarded the second prize in a competition initiated by the academy of Parma, styling himself "pupil to Bayeu, painter to the king of Spain." Compelled to quit Rome somewhat suddenly, he appears again in Madrid in 1775, the husband of Bayeu's daughter, and father of a son. On returning to Madrid he commenced painting canvases for the tapestry factory of Santa Barbara, in which the king took much interest. Between 1776 and 1780 he appears to have supplied thirty examples, receiving about £1,200 for them.

In portraiture, without doubt, Goya excelled; his portraits are evidently life-like and unexaggerated, and he disdained flattery. He worked rapidly, and during his long stay at Madrid painted, among many others, the portraits of four sovereigns of Spain—Charles III. and IV.; Ferdinand VII., and "King Joseph." The duke of Wellington also sat to him; but on his making some remark which raised the artist's choler, Goya seized a plaster cast and hurled it at the head of the duke. There are extant two pencil sketches of Wellington, one in the British Museum, the other in a private collection. One of his best portraits is that of the lovely Andalusian duchess of Alva. Goya retired from Madrid, desiring probably during his latter years to escape the trying climate of that capital. He died at Bordeaux in his eighty-third year, and a monument has been erected there over his remains. From the deaths of Velasquez and Murillo to the advent of Fortuny, Goya's name is the only important one found in the history of Spanish art.

GOYAZ, or, as it was formerly called, Villa Boa de Goyaz, the chief town of the province of Goyaz in Brazil, in the valley of the auriferous Velmelho, a right-hand tributary of the Araguaia. Population (1890), 8,000.

GOYEN, JAN JOSEPHSZOON VAN, was born at Leyden on January 13, 1596, learned painting under several masters at Leyden and Haarlem, married in 1618, and settled at the Hague about 1631. One of the few Dutch painters who failed to captivate English taste, his influence was great on Dutch art; and he was one of the first to emancipate himself from the traditions of minute imitation embodied in the works of Breughel and Savery. He died at the Hague in 1656, possessed of land and houses to the amount of 15,000 florins.

GOZLAN, LÉON, a French novelist and play writer, was born at Marseilles in 1803, and died in 1866. When he was still a boy, his father, who had made a large fortune as a ship-broker, met with adverse circumstances, and Léon, before completing his education, had to go to sea in order to earn a living. He went several trading voyages to Algiers and to Senegal, without, it would seem, much profit. In the meantime his literary tastes gradually developed, and he abandoned mercantile pursuits for the employment of a teacher in Marseilles. He, however, did not remain long there, and in 1828 we find him in Paris, determined to run the risks of literary life. His townsman, Joseph Méry, who was then making himself famous by his political satires, smoothed his way, and introduced him to several newspapers. But Gozlan did not sacrifice literature to politics. Though he contributed many essays to the reviews, it is as a fertile and ingenious author of novels and plays that he is best known.

GOZO. See MALTA.



**GOZZI, CARLO, COUNT**, an Italian dramatist, was descended from an old Venetian family, and was born in March, 1722. At the age of sixteen he joined the army in Dalmatia; but three years afterward returned to Venice, where he soon made a reputation for himself as the wittiest member of the Granelleschi society, to which the publication of several satirical pieces had gained him admission. This society, nominally devoted to conviviality and wit, had also serious literary aims, and was especially zealous to preserve the Tuscan literature pure and untainted by foreign influences. The displacement of the old Italian comedy by the dramas of Chiari and Goldoni, founded on French models, threatened defeat to all their efforts; and in 1757 Gozzi came to the rescue by publishing a satirical poem, and in 1761 by a comedy, a parody of the manner of the two obnoxious poets, founded on a fairy tale. For its representation he obtained the services of the Sacchi company of players, who, on account of the popularity of the comedies of Chiari and Goldoni—which afforded no scope for the display of their peculiar talents—had been left without employment; and as their satirical powers were thus sharpened by personal enmity, the play met with extraordinary success. Struck by the effect produced on the audience by the introduction of the supernatural or mythical element, which he had merely used as a convenient medium for his satirical purposes, Gozzi now produced a series of dramatic pieces based on fairy tales, which, for a period, obtained great popularity, but after the breaking up of the Sacchi company were completely disregarded. They have, however, obtained high praise from Goethe, Schlegel, Madame de Staël, and Sismondi; and one of them, *Re Turandote*, was translated by Schiller. In his later years Gozzi set himself to the production of tragedies, in which the comic element was largely introduced; but as this innovation proved unacceptable to the critics, he had recourse to the Spanish drama, from which he obtained models for various pieces which, however, met with only equivocal success. He died April 4, 1806.

**GOZZI, GASPARO, COUNT**, eldest brother of Carlo Gozzi, was born December 4, 1713. In 1739 he married the poetess, Louise Bergalli, and she undertook the management of the theater of San Angelo, Venice, he supplying the performers with dramas chiefly translated from the French. The speculation proved unfortunate, but meantime he had attained a high reputation for his contributions to the *Gazetta Veneta*, and he soon came to be known as one of the ablest critics and purest and most elegant stylists in Italy. For a considerable period he was censor of the press in Venice, and in 1774 he was appointed to reorganize the university system at Padua. He died at Padua, December 26, 1786.

**GOZZOLI, BENOZZO**, an eminent painter, was born in Florence in 1424, or perhaps 1420, and in the early part of his career assisted Fra Angelico, whom he followed to Rome, and worked with at Orvieto. While in Rome, he executed, in the *Capella* at Araceli, a fresco of *St. Anthony and Two Angels*. In 1449 he left Angelico, and went to Montefalco, near Foligno in Umbria. In S. Fortunato, near Montefalco, he painted a *Madonna and Child with Saints and Angels*, and three other works. One of these, the altar-piece representing St. Thomas receiving the Girdle of the Virgin, is now in the Lateran Museum, and shows the affinity of Gozzoli's early style to Angelico's. He next painted in the monastery of St. Francis, Montefalco, filling the choirs with a triple course of subjects from the life of the saint, with various accessories, including heads of Dante, Petrarch, and Giotto. This work was completed in 1452, and is still marked by the style of Angelico, crossed here and there with a more distinctly

Giottesque influence. In the same church, in the chapel of St. Jerome, is a fresco by Gozzoli of the *Virgin and Saints, the Crucifixion*, and other subjects. He remained at Montefalco probably till 1456, employing Mesastris as assistant. Thence he went to Perugia, and painted in a church a *Virgin and Saints*, now in the local academy, and soon afterward to his native Florence, the headquarters of art. By the end of 1459 he had nearly finished his important labor in the chapel of the Palazzo Riccardi, *The Journey of the Magi to Bethlehem*, and, in the tribune of this chapel, a composition of *Angels in Paradise*. His picture in the London National Gallery, a *Virgin and Child with Saints*, 1461, belongs also to the period of his Florentine sojourn. Another small picture in the same gallery, *the Rape of Helen*, is of dubious authenticity. In 1464 Gozzoli left Florence for S. Gimignano, where he executed some extensive works; in the church of St. Augustine, a composition of St. Sebastian protecting the city from the plague of this same year, 1464; over the entire choir of the church, a triple course of scenes from the legends of St. Augustine, from the time of his entering the school of Tegaste on to his burial, seventeen chief subjects, with some accessories; in the Pieve di S. Gimignano, the *Martyrdom of Sebastian*, and other subjects, and some further works in the city and its vicinity. Here his style combined something of Lippo Lippi with its original elements, and he received coöperation from Giusto d'Andrea. He staid in this city till 1467, and then began, in the Campo Santo of Pisa, from 1469, the vast series of mural paintings with which his name is specially identified. These are twenty-four subjects from the Old Testament, with the *Invention of Wine by Noah* to the *Visit of the Queen of Sheba to Solomon*. He contracted to paint three subjects per year, for about ten ducats each—a sum which may be regarded as equivalent to about £100 at the present day. It appears, however, that this contract was not strictly adhered to, for the rate of painting was only three pictures in two years. Perhaps the great multitude of figures and accessories was accepted as a set-off against the slower rate of production. By January, 1470, he had executed the fresco of *Noah and his Family*,—followed by the *Curse of Ham*, the *Building of the Tower of Babel* (which contains portraits of Cosmo de' Medici, the young Lorenzo, Poliziano, and others), the *Destruction of Sodom*, the *Victory of Abraham*, the *Marriages of Rebecca and of Rachel*, the *Life of Moses*, etc. In the Cappella Ammannati, facing a gate of the Campo Santo, he painted also an *Adoration of the Magi*, wherein appears a portrait of himself. He died about 1496.

**GRAAL**. See **GRAIL**.

**GRABE, JOHANN ERNST**, a learned divine of the Anglican Church, was born July 10, 1666, at Königsberg, where his father, the author of some treatises now forgotten, was professor of theology and history. In the course of his theological studies Grabe succeeded in persuading himself of the schismatical character of the Reformation of the sixteenth century, and accordingly presented to the consistory at Samland a memorial in which he compared the position of the evangelical Protestant churches with that of the Simonians, Novatians, and other ancient schismatics. He died on November 3, 1711, and in 1726 a monument was erected to him by Lord Oxford in Westminster Abbey.

**GRABOW**, a town of Pomerania, Prussia, government district of Stettin and circle of Randow, is situated on the Oder below Stettin, and closely adjoining its suburbs. Population in 1890, 12,000.

**GRACCHUS** is the name of a family of the *Gens*



Sempronia. To this family there attaches a remarkably sweet and lovable nature, which, combined with their high character and ability, makes their history the most charming page in the Roman annals. Tiberius Sempronius Gracchus was appointed *magister equitum* after the battle of Cannæ, and held the consulship in 215 and 213 B.C. During the great weakness that followed the defeat at Cannæ the resolute and judicious generalship by which he ably seconded Fabius did much to maintain a courageous attitude at Rome. He raised some legions of slaves; and his generous conduct kept them together and made them important in the war. After several successes he was betrayed by a Lucanian to the hands of Mago, and having fallen in the battle that ensued, he was honored with a magnificent burial by Hannibal. Another Tiberius, born about 210, married Cornelia, the daughter of Scipio Africanus, who is famous as the highest type of Roman matron. As *prætor* and *proprætor*, Gracchus governed Hither Spain from 181 to 178. He conquered the Celtiberi, and by his magnanimous and kindly treatment of the Spaniards made a lasting impression on them. He was consul in 177 and 163. In 169, as censor, his review of the senate and equites was very strict; but, though his colleague became unpopular, Gracchus remained as much esteemed as ever. He enjoyed a high reputation for his power of calming down internal seditions and conciliating foreign enemies of the state. One of his daughters became the wife of Scipio Africanus the younger; while his two sons, Tiberius and Gaius, famous besides for having determined the history of Rome at a critical point, are as remarkable for the charm of their personal character and for the careful education given them by their widowed mother. Tiberius served as *quæstor* in Spain in 137; and the respect still entertained by the Spaniards for his father's name enabled him to save the Roman army from utter ruin after its defeat by the Numantinis. (See ROMAN HISTORY.)

GRACES is the name generally given to the Greek goddesses Charites. The chief seat of their worship was the ancient Boeotian city Orchomenus. They were three in number, but their names were not known; and stones fallen from heaven stood in their temple as symbols of the goddesses. Their worship was instituted by a king Eteocles, whose three daughters fell into a well while dancing in honor of the Charites.

GRACKLE, a word which has been much used in ornithology, but generally in a vague sense, though restricted to members of the families *Sturnidæ* belonging to the Old World, and *Icteridæ* belonging to the New. Of the former those to which it has been most commonly applied are the species variously known as Mynas, Mainas, and Minors of India and the adjacent countries, and especially the *Gracula religiosa* of Linnæus, who, according to Jerdon and others, was very probably led to confer this epithet upon it by confounding it with the *Sturnus* or *Acridotheres tristis*, which is regarded by the Hindus as sacred to Ram Deo, one of their deities, while the true *Gracula religiosa* does not seem to be anywhere held in veneration.

GRACIAN, BALTAZAR, one of the principal "cultistas" or Spanish prose writers of the school of Gongora, was born at Calatayud, Aragon, in 1584. Little is known of his personal history except that on attaining to manhood he entered the Society of Jesus, and that ultimately he became rector of the Jesuit College at Tarazona, where died in 1658. His principal works are *El Héroe* (1630), written in short compact sentences, which has been described as a sort of recipe for making a hero; *La Agudza, y Arte de Ingenio* (1648), a sort of art of poetry or system of rhetoric in which the principles

of "Gongorism" are inculcated; *Criticón* (1650-53), an allegory in which, under the imagery of the seasons of the year, the course of human life is described; *El Discreto*, a delineation of the typical character of a courtier; *Oráculo Manual*, a system of rules for the conduct of life.

GRADISCA, a town of Austria, in the principality of Görz and Gradisca, situated about ten miles southwest of Görz, on the right bank of the Isonzo. Population (1890) 3,500.

GRADUATION is the name given to the art of dividing straight scales, circular arcs, or whole circumferences into any required number of equal parts. It is the most important and difficult part of the work of the mathematical instrument maker, and is required in the construction of most physical, astronomical, nautical and surveying instruments, such as thermometer scales, linear measuring instruments, quadrants, sextants, mural circles, theodolites, etc.

The art was, undoubtedly, first practiced by clock-makers for cutting the teeth of their wheels at regular intervals; but so long as it was confined to them, no particular delicacy or accurate nicety in its performance was required. This only arose when astronomy began to be seriously studied, and the exact position of the heavenly bodies to be determined, which created the necessity for strictly accurate means of measuring linear and angular magnitude. Then graduation began to be looked upon as an art which required special talents and training, and hence we find that all the best artists have spent their best efforts on the perfecting of astronomical instruments. Of these may be named Abraham Sharp, Bird, Smeaton, Ramsden, the Duc de Chaulnes, John and Edward Troughton, Simms and Ross.

It is obvious that the first graduated instrument must have been done by the hand and eye alone, whether it was in the form of a straight-edge with equal divisions, or a screw, or a divided plate; but, once in the possession of one such divided instrument, it was a comparatively easy matter to employ it as a standard, and copy its divisions on any other article that might be desired. Hence graduation naturally divides itself into two distinct branches, *original graduation* and *copying*, which latter may be done either by the hand or by a machine called a dividing engine. It is proper thus to speak of graduation under the three heads of *original graduation*, *copying* and *machine graduation*.

GRÆCIA, MAGNA, was the name given to the Greek cities along the coast of South Italy, while the people were called Italiotes. Like most Greek colonies, they were established first as trading stations, which grew into independent cities. At a very early time a trade in copper was carried on between Greece and the Terinæan Gulf. The trade for long lay chiefly in the hands of the Eubœans; and Cyme in Campania was founded far back in the pre-historic time, when the Eubœan Cyme was still a great city. To strengthen the connection with the far off Cyme, the Chalcidians, who became early the leaders of Eubœan enterprise, established Rhegium, (about 730 B.C.) After this the energy of Chalcis went onward to Sicily, and the states of the Corinthian Gulf carried out the colonization of Italy. Sybaris (720) and Crotona (710) were Achæan settlements; Locri Epizephyrii (about 710) was settled by Ozolian Locrians, and when (about 708) the Spartans wished to get rid of a band of unruly citizens, the connection formed by the trade in purple that was common to the shores of Laconia and Tarentum directed their colony thither. Ionian Greeks fleeing from foreign invasion founded Siris and, much later, Elea (540).

GRÆVIUS. Johann Georg Gräfe, Greffe, or



Grævius, one of the great classical scholars of the seventeenth century, was born at Naumburg, Saxony, January 29, 1632, and after receiving the usual school education at the gymnasium of Pforta became a student of law in the university of Leipsic. During a casual visit to Deventer in his eighteenth year, he became acquainted with Gronovius; and this circumstance greatly stimulated a taste for pure scholarship which he had already begun to display somewhat to the detriment of his professional prospects. Finally abandoning jurisprudence shortly afterward, he studied philology for two years under Gronovius, and subsequently sat under Heinsius at Leyden, and under Morus and Blondel at Amsterdam. During his residence in the last-named city he abandoned Lutheranism and joined the Reformed Church; and in 1656 he was called by the elector of Brandenburg to the chair of belles lettres in the university of Duisburg. Two years afterward he was, on the recommendation of Gronovius, chosen to succeed that scholar at Deventer; and in 1662 he was translated to the university of Utrecht, where he occupied first the chair of rhetoric, and afterward from 1667 until his death (January 11, 1703) that of history and politics.

GRÄFE, ALBRECHT VON, German oculist, son of Karl Ferdinand von Gräfe, noticed below, was born at Berlin in May, 1828. At an early age he manifested a preference for the study of mathematics, but this was gradually superseded by an interest in natural science, which led him ultimately to the study of medicine. After obtaining government license at Berlin, he prosecuted his studies at Vienna, Prague, and Paris, devoting special attention to ophthalmology. In 1850 he began practice as an oculist in Berlin, where he founded a private institution for the treatment of the eyes, which became the model of many similar ones in Germany and Switzerland. In 1853 he was appointed teacher of ophthalmology in Berlin university, in 1856 extraordinary professor, and in 1866 ordinary professor. He died at Berlin, August 20, 1870.

GRÄFE, HEINRICH, educationist, was born at Buttstädt in Weimar, May 3, 1802, studied mathematics and theology at Jena, and in 1823 obtained a curacy in the stadtkirche of Weimar. Thence he was transferred to Jena as rector of the town school in 1825; in 1840 he was also appointed extraordinary professor of the science of education (*Pädagogik*) in that university; and in 1842 he became head of the bürgerschule in Cassel. After reorganizing the schools of the town, he became director of the new realschule in 1843; and, devoting himself with great zeal and energy to the interests of educational reform in electoral Hesse, he became in 1849 a member of the school commission, and also entered the house of representatives, where he attached himself to the democratic party and made himself somewhat formidable as an agitator. In 1852 for having been implicated in the September riots and in the movement against the unpopular minister Hassenpflug (who had dissolved the school commission) he was condemned to three years' imprisonment, a sentence which was afterward reduced to one of twelve months. On his release he withdrew to Geneva, where he engaged in educational work till 1855, when he was appointed director of the school of industry at Bremen. He died in that city July 21, 1868.

GRÄFE, CARL FERDINAND VON, German surgeon, was born at Warsaw, March 8, 1787. He studied medicine at Halle and Leipsic, and after obtaining license from the latter university, he was in 1807 appointed private physician to Duke Alexius of Anhalt-Bernburg. In 1811 he became professor of surgery at Berlin, and during the war with Napoleon he was superintendent of the military hospitals. When peace

was concluded in 1815, he resumed his professorial duties. He was also appointed to the medical staff of the army, and he became a director of the Frederick-William Institute, and of the Medico-Chirurgical Academy. He died suddenly, July 4, 1840, at Hanover, whither he had been called to operate on the eyes of the crown prince.

GRAFTON, a town in Taylor county, W. Va., 280 miles west of Baltimore, and 99 miles southeast of Wheeling. It is a station on the Baltimore & Ohio railroad, and possesses banking and telegraph facilities, flour-mills, a foundry, and the railroad machine shops. Population (1890), 5,000.

GRÄFRATA, a town of Rhenish Prussia, government district of Düsseldorf, circle of Solingen, situated on the small river Itter, fourteen miles east of Düsseldorf. Population (1890), 6,000.

GRAGANO, a town of Italy, in the province of Naples and circle of Castellamare, about two and a half miles east of Castellamare. Population (1890), 12,278.

GRAHAM, SIR JAMES GEORGE ROBERT, Bart., a well-known British statesman, was born at Naworth, Cumberland, June 1, 1792. From Westminster school he duly passed to Queen's College, Cambridge; and shortly after quitting the university, while making the "grand tour" abroad, he became private secretary to the British minister in Sicily, in which capacity he not only acquired much useful experience but also rendered some important services. Shortly after his return to England he, in 1818, after a contest of extraordinary keenness, was returned to parliament as member for Hull in the Whig interest; but he was unseated at the election of 1820. In 1824 he succeeded to the baronetcy on his father's death; and in 1826 he again entered parliament as representative for Carlisle. In the same year he published a pamphlet entitled *Corn and Currency*, which brought him into considerable prominence in the political world as a man of advanced Liberal opinions; and having been returned in 1830 for the county of Cumberland, he became one of the most energetic advocates in parliament of the Reform Bill. On the formation of Earl Grey's administration he received the post of first lord of the admiralty, with a seat in the cabinet. From 1832 to 1837 he sat for the eastern division of the county of Cumberland; but dissensions on the Irish Church question led to his withdrawal from the ministry in 1834, and ultimately to his joining the Conservative party. Rejected by his former constituents in 1837, he was in 1838 elected for Pembroke, and in 1841 for Dorchester. In the latter year he took office under Sir Robert Peel as secretary of state for the home department, and this post he retained until 1846. As home secretary he incurred considerable odium, in Scotland at least, by his unconciliating policy on the church question prior to the "disruption" of 1843; and in 1844 the detention and opening of letters at the postoffice by his warrant raised a storm of public indignation, which was hardly allayed by the favorable report of a parliamentary committee of investigation. From 1846 to 1852 he was out of office; but in the latter year he joined Lord Aberdeen's cabinet as first lord of the admiralty, in which capacity he acted also for a short time in the Palmerston ministry of 1855, until the appointment of a select committee of inquiry into the conduct of the Russian war put him upon his defense, and ultimately led to his withdrawal from official life. He continued, however, as a private member to exercise a considerable influence on parliamentary opinion until his death, which occurred at Netherby, Cumberland, October 26, 1861.

GRAHAM, THOMAS, born at Glasgow on December 21, 1804, was the son of a merchant of that city. In



1819 he entered the university of Glasgow, and graduated in 1824. At this time the chair of chemistry was held by Dr. Thomas Thomson, whose researches bearing on the atomic theory cannot fail to have had much influence in turning Graham's thoughts to the study of molecular physics to which he so patiently devoted his life. The beginning of his career appears to have been much embittered by his father's opposition, who wished him to become a minister of the Established Church. His own views, however, prevailed, and he worked for two years in the laboratory of Doctor Hope of Edinburgh before returning to Glasgow, where he taught mathematics, and subsequently chemistry, until the year 1829, when he was appointed lecturer in the Mechanics' Institute. In 1830 he succeeded Doctor Ure as professor of chemistry in the Andersonian Institution, and, on the death of Dr. Edward Turner, he was transferred to the chair of chemistry in University College, London. He presided over the chemical section of the British Association at the Birmingham meeting in 1839, and in 1841 was chosen as the first president of the Chemical Society of London. He resigned his professorship on being appointed to succeed Sir John Herschel as Master of the Mint, a post he held until his death in September, 1869. The researches, which he conducted between 1861 and 1869 were as brilliant as any of those in which he engaged. Graham was elected a fellow of the Royal Society in 1837, a corresponding member of the Institute of France in 1847, and doctor of civil law in 1855. The presidency of the Royal Society was offered him toward the close of his life, but his failing health caused him to shrink from accepting the honor.

GRAHAME, JAMES, was born at Glasgow, April 22, 1765. His principal work is *The Sabbath*—a sacred and descriptive poem in blank verse, characterized by a fine vein of tender and devotional feeling, and by the happy delineation of Scottish scenery. He is the Cowper of Scotland, but wants Cowper's mastery of versification and easy idiomatic vigor of style.

GRAHAM'S TOWN, the metropolis of the eastern districts of the Cape Colony, South Africa, is situated in the division of Albany, eighty miles inland from Algoa Bay, forty miles inland from Port Alfred, and six hundred miles from Cape Town. The population of Graham's Town, according to the last census, is 7,000. It is the center of trade for an extensive pastoral and agricultural country, and has easy communication both with Port Alfred, at the mouth of the Kowie river, and with Port Elizabeth on Algoa Bay.

GRAIL, or GRAYLE, THE HOLY, the name given to the legendary wonder-working vessel said to have been brought by Joseph of Arimathea to Britain.

GRAINS OF PARADISE, GUINEA GRAINS, or MELEGUETA PEPPER, are the seeds of *Amomum Melegueta*, Roscoe, a reed-like plant of the natural order *Zingiberaceæ*, which is a native of tropical western Africa, and of Princes and St. Thomas' Islands in the Gulf of Guinea, is cultivated in British Guiana, and may with ease be grown in hot-houses in England. The plant has a branched horizontal rhizome; smooth, nearly sessile, alternate leaves, with the blade oblong-lanceolate; large, white, pale pink, or purplish flowers; and an ovate-oblong fruit, ensheathed in bracts, which is of a scarlet color when fresh, and reaches under cultivation a length of five inches. The seeds are contained in the acid pulp of the fruit, are commonly wedge-shaped and bluntly angular, are about one and one-quarter line in diameter, and have a glossy dark brown husk, with a conical light-colored membranous caruncle at the base, and a white kernel.

GRAM, or CHICK-PEA, called also Egyptian Pea, or

Bengal Gram, an herbaceous, annual, leguminous plant, the *Cicer arietinum* of Linnæus, so named from the resemblance of its seed to a ram's head, is a native of the south of Europe and India. Its leaves are imparipinnate, with ovate, equal, and serrate leaflets; the flowers are axillary, and of a bluish-purple color, and bloom in India from September to October; and the pods have a length of one to one and a half inches, and contain either one or two somewhat pointed and commonly pale yellow seeds, about three lines long.

GRAMMAR. By the grammar of a language is meant either the relations borne by the words of a sentence and by sentences themselves, one to another, or the systematized exposition of these. The exposition may be, and frequently is, incorrect; but it always presupposes the existence of certain customary uses of words when in combination. In what follows, therefore, grammar will be generally employed in its primary sense, as denoting the mode in which words are connected together in order to express a complete thought, or as it is termed in logic, a proposition.

The object of language is to convey thought, and, so long as this object is attained, the machinery for attaining it is of comparatively slight importance. The way in which we combine our words and sentences matters but little, provided that our meaning is clear to others. The expressions "horseflesh" and "flesh of a horse," are equally intelligible to an Englishman, and therefore are equally recognized by English grammar. The Chinese manner of denoting a genitive is by placing the defining word before that which it defines, as in *koue jin*, "man of the kingdom," literally "kingdom man;" and the only reason why it would be incorrect in French or Italian is that such a combination would be unintelligible to a Frenchman or an Italian. Hence it is evident that the grammatical correctness or incorrectness of an expression depends upon its intelligibility—that is to say, upon the ordinary use and custom of a particular language. Whatever is so unfamiliar as not to be generally understood is also ungrammatical. In other words, it is contrary to the habit of a language, as determined by common usage and consent.

In this way we can explain how it happens that the grammar of a cultivated dialect and that of a local dialect in the same country so frequently disagree. Thus, in the dialect of West Somerset, *thee* is the nominative of the second personal pronoun, while in cultivated English the plural accusative *you* has come to represent a nominative singular. Both are grammatically correct within the sphere of their respective dialects, but no further. *You* would be as ungrammatical in West Somerset as *thee* is in classical English; and both *you* and *thee*, as nominative singular, would have been equally ungrammatical in Early English. Grammatical propriety is nothing more than the established usage of a particular body of speakers at a particular time in their history.

It follows from this that the grammar of a people changes, like its pronunciation, from age to age. Anglo-Saxon or Early English grammar is not the grammar of Modern English, any more than Latin grammar is the grammar of modern Italian; and to defend an unusual construction or inflexion on the ground that it once existed in literary Anglo-Saxon, is as wrong as to import a peculiarity of some local dialect into the grammar of the cultivated speech. It further follows that different languages will have different grammars, and that the differences will be more or less according to the nearer or remoter relationship of the languages themselves, and the modes of thought of those who speak them. Consequently, to force the grammatical framework of one language upon another is to miscon-



ceive the whole nature of the latter, and seriously to mislead the learner. Chinese grammar, for instance, can never be understood until we discard, not only the terminology of European grammar, but the very conceptions which underlie it, while the polysynthetic idioms of America defy all attempts to discover in them "the parts of speech" and the various grammatical ideas which occupy so large a place in our school-grammars. The endeavor to find the distinctions of Latin grammar in that of English has only resulted in grotesque errors, and a total misapprehension of the usage of the English language.

It is to the Latin grammarians — or, more correctly, to the Greek grammarians, upon whose labors those of the Latin writers were based — that we owe the classification of the subjects with which grammar is commonly supposed to deal. The grammar of Dyonisius Thrax, which he wrote for Roman schoolboys in the time of Pompey, has formed the starting-point for the innumerable school-grammars which have since seen the light, and suggested that division of the matter treated of which they have followed. He defines grammar as a practical acquaintance with the language of literary men, and as divided into six parts — accentuation and phonology, explanation of figurative expressions, definition, etymology, general rules of flexion, and critical canons. Of these, phonology and accentuation, or prosody, can properly be included in grammar only in so far as the construction of a sentence and the grammatical meaning of a word are determined by accent or letter-change; the accentual difference in English, for example, between *in'cense* and *incense* belongs to the province of grammar, since it indicates a difference between noun and verb; and the changes of vowel in the Semitic languages, by which various nominal and verbal forms are distinguished from one another, constitute a very important part of their grammatical machinery. But where accent and pronunciation do not serve to express the relation of words in a sentence, they fall into the domain of phonology, not of grammar. The explanation of figurative expressions, again, must be left to the rhetorician, and definition to the lexicographer; the grammarian has no more to do with them than he has with the canons of criticism.

In fact, the old subdivision of grammar, inherited from the grammarians of Rome and Alexandria, must be given up, and a new one put in its place. What grammar really deals with are all those contrivances whereby the relations of words and sentences are pointed out. Sometimes it is position, sometimes phonetic symbolization, sometimes composition, sometimes flexion, sometimes the use of auxiliaries, which enables the speaker to combine his words together so that they shall be intelligible to another. Grammar may accordingly be divided into the three departments of composition or "word-building," syntax, and accidence, by which is meant an exposition of the means adopted by language for expressing the relations of grammar when recourse is not had to composition or simple position.

A good practical grammar of a language should be based on a correct appreciation of the facts which it expounds, and a correct appreciation of the facts is only possible where they are examined and coördinated in accordance with the scientific method. A practical grammar ought, wherever it is possible, to be preceded by a scientific grammar.

The historical grammar of a single language or dialect, which traces the grammatical forms and usages of the language as far back as documentary evidence allows, affords material to the comparative grammarian, whose task it is to compare the grammatical forms and usages of an allied group of tongues, and thereby reduce them to their earliest forms and senses. The work thus car-

ried out by the comparative grammarian within a particular family of languages is made use of by universal grammar, the object of which is to determine the ideas that underlie all grammar whatsoever, as distinct from those that are peculiar to special families of speech. Universal grammar is sometimes known as "the metaphysics of language," and it has to decide such questions as the nature of gender, or of the verb, the true purport of the genitive relation, or the origin of grammar itself. Such questions, it is clear, can only be answered by comparing the results gained by the comparative treatment of the grammars of various groups of language. What historical grammar is to comparative grammar, comparative grammar is to universal grammar.

Universal grammar, as founded on the results of the scientific study of speech, is thus essentially different from that "universal grammar" so much in vogue at the beginning of the present century, which consisted of a series of *a priori* assumptions based on the peculiarities of European grammar and illustrated from the same source. But universal grammar, as conceived by modern science, is as yet in its infancy; its materials are still in the process of being collected. The comparative grammar of the Aryan languages is alone in an advanced state, those of the Semitic idioms, of the Ugro-Altaic tongues, and of the Bantu or Kaffre dialects of southern Africa, are still in a backward condition; and the other families of speech existing in the world, with the exception of the Malayo-Polynesian, and the Sonorian of North America, have not as yet been treated scientifically. Chinese, it is true, possesses an historical grammar, and Mr. Van Eys, in his comparative grammar of Basque, has endeavored to solve the problems of that interesting language by a comparison of its various dialects; but in both cases the area of comparison is too small for more than a limited success to be attainable.

It is obvious that grammar constitutes the surest and most important basis for a classification of languages. Words may be borrowed freely by one dialect from another, or, though originally unrelated, may by the action of phonetic decay, come to assume the same forms, while the limited number of articulate sounds and conceptions out of which the language was first developed, and the similarity of the circumstances by which the first speakers were everywhere surrounded, naturally produce a resemblance between the roots of many unconnected tongues. Where, however, the fundamental conceptions of grammar, and the machinery by which they are expressed are the same, we may have no hesitation in inferring a common origin.

The main results of scientific inquiry into the origin and primitive meaning of the forms of Aryan or Indo-European grammar may be summed up as follows. We start with stems or themes, by which are meant words of two or more syllables which terminate in a limited number of sounds. These stems can be classed in groups of two kinds, one in which the groups consist of stems of similar meanings and similar initial syllables, and another in which the final syllables alone coincide. In the first case we have what are termed roots, the simplest elements into which words can be decomposed; in the second case stems proper, which may be described as consisting of suffixes attached to roots. Roots therefore, are merely the materials out of which speech can be made, the embodiments of isolated conceptions with which the lexicographer alone has to deal, whereas stems present us with words already combined in a sentence and embodying the relations of grammar. If we would rightly understand primitive Aryan grammar, we must conceive it as having been expressed or implied in the suffixes of the stems, and in the order according to which the stems were arranged in a sentence. In



other words, the relations of grammar were denoted partly by juxtaposition or syntax, partly by the suffixes of stems.

These suffixes were probably at first unmeaning, or rather clothed with vague significations, which changed according to the place occupied in the sentence by the stem to which they were joined. Gradually this vagueness of signification disappeared, and particular suffixes came to be set apart to represent particular relations of grammar. What had hitherto been expressed by mere position now attached itself to the terminations or suffixes of stems, which accordingly became full-grown words. Some of the suffixes denoted purely grammatical ideas, that is to say, were flexions; others were classificatory, serving to distinguish nouns from verbs, presents from aorists, objects from agents and the like; while others, again, remained unmeaning adjuncts of the root. This origin of the flexions explains the otherwise strange fact that the same suffix may symbolize wholly different grammatical relations. In Latin, for instance, the context and dictionary will alone tell us that *mus-as* is the accusative plural of a noun, and *am-as* the second person singular of a verb, or that *mus-a* is the nominative singular of a feminine substantive, *bon-a* the accusative plural of a neuter adjective. In short, the flexions were originally merely the terminations of stems which were adapted to express the various relations of words to each other in a sentence, as these gradually presented themselves to the consciousness and were extracted from what had been previously implied by position. Necessarily, the same suffix might be used sometimes in a classificatory, sometimes in a flexional sense, and sometimes without any definite sense at all.

GRAMMONT, a town of Belgium, province of East Flanders, is situated on both sides of the Dender, twenty-one miles south-southeast of Ghent. Population (1890) 9,000.

GRAMONT, PHILIBERT, COUNT DE. A happy accident has preserved for the instruction of mankind rather than for their edification the portrait and the history of a man who entirely represents one section, fortunately a small section, of the society of his day. Of good family, rich, a gallant soldier, endowed with every kind of cleverness, the Count de Gramont endeavored to live the life of unrestrained enjoyment. In this he so far succeeded that, although the following century furnished more numerous examples of his kind, he may be taken as the most finished specimen. His ideal man was a being without conscience, without principle, without religion, without a soul. He crossed over to England during the protectorate of Cromwell. In the year 1662, two years after the restoration of Charles II., he was exiled from the French court, and again repaired to London, where he found such a welcome as was due to his manners, his gayety, his extraordinary good spirits, and his love of gambling, intrigue, gallantry and pleasure. It is the period of his residence at the English court, which forms the greater part of Hamilton's memoirs. In the whole English court there was no one more full of wit, more avid of pleasure, more devoid of all moral restraint, not even Rochester himself, than the Count de Gramont. Naturally, the court being what it was, there was no one more popular. In a court where the women vied with each other for the king's favor, where the men habitually cheated at play, seduced their friends' wives, and corrupted their friends' daughters, that man would be most popular in whom the absence of principle became, by reason of his grace, *esprit*, and elegance, in itself a recommendation. Gramont was as purely a sensualist as any Roman of the later empire.

He married, in London, but, on compulsion, the sister of his future biographer, Miss Hamilton, who, her brother tells us in the memoirs, was able to fix his affections. The statement must be received with some qualifications. The count, it is true, was by no means young when he married. At the same time, he "galantisait" for many years afterward, and, in fact, to the very end of a long life. He was the only old man, says Ninon de l'Enclos, who could affect the follies of youth without being ridiculous. In fact, Gramont, like La Fontaine, was a spoiled child, to whom everything was allowed, and who repaid indulgence by perpetual high spirits, and a continual flow of wit and *bons mots*. At the age of seventy-five he had a dangerous illness, during which he became reconciled, in his way, to the church, but on recovery relapsed into his old habits. At eighty he either dictated or revised his own memoirs, written by his brother-in-law Antony Hamilton. When they were finished he sold the manuscript for 1,500 francs and kept most of the money himself. Fontenelle, then censor of the press, refused to license the work, from considerations of respect to the old man who had so strangely exposed in its pages the whole of his character. These scruples were overcome by the count himself, who had the pleasure of seeing his biography appear in his own lifetime, and of laughing with the rest of the world at his own rogueries at cards, his amorous adventures, and his secret intrigues. He died at the great age of 86.

GRAMPUS, a cetacean belonging to the *Delphinidae* or dolphin family, and characterized by its rounded head with distinct beak, its high dorsal fin, and its large conical permanent teeth. Its upper part is of a nearly uniform glossy black color, and the under part white, with a strip of the same color over each eye.

GRAN, the capital of a county of the same name, seat of the prince primate, and formerly a royal free city, is situated on the right bank of the Danube, nearly opposite the confluence of the Garam (Gran), twenty-five miles northwest of Buda.

GRANADA, a modern province of Spain, consisting of the central portion of the old kingdom of the same name, is bounded on the north and northeast by Jaen, Albacete, and Murcia, on the east by Almeria, on the south by the Mediterranean, and on the west by Malaga and Cordova, having an area of 4,937 English square miles and an estimated population of 485,346.

GRANADA, the capital of the above province, is situated at the confluence of the Darro and the Genil, not far from the base of the Sierra Nevada. The more ancient quarters of the town still retain much of the Moorish style, but the modern part is somewhat commonplace. It contains several squares, of which the most remarkable is the Bibarrambla, where tournaments were formerly held. There is also a beautiful shady walk, called the Alameda, which is one of the most frequented promenades. The old city comprises the faubourgs of Antequeruela, Alcazaba, Alhambra, and Albacin, the last being named after the settlers who came from Baeza, after the capture of that city by St. Ferdinand. For a detailed account of the Alhambra the reader is referred to the special article. The town proper contains a great number of churches and other public edifices. The cathedral, a somewhat heavy and irregular building, was begun in 1529 by Diego de Siloe, and finished in 1639. It is profusely ornamented with jasper and colored marble and surmounted by a dome; and it contains several valuable paintings by Alonso Cano, portraits of Ferdinand and Isabella by Rinçon, and marble statues of several kings and queens of Spain. In one of its numerous chapels (the Chapel Royal) are buried their "Catholic Majesties," and Philip and Juana. Population about 75,000.



GRANADA, a city of Central America, state of Nicaragua, is situated on the northwest bank of the Lake of Nicaragua, thirty miles north-northwest of the town of that name. Population (1890) 25,000.

GRANADA, LUIS DE, a Spanish preacher and ascetic writer, born of poor parents at Granada in 1504. Having been invited by Cardinal Henry, infant of Portugal and archbishop of Evora, to Badajoz in 1555, he founded a monastery there, and two years later was elected provincial of Portugal. He was also appointed confessor and councilor to the queen regent, but he declined promotion to the archbishopric of Braga, and on the expiry of his provincial office in 1561 he retired to a Dominican convent at Lisbon, where he died in 1588.

GRANADILLA, the name applied to *Passiflora quadrangularis*, Linn., a plant of the natural order *Passifloræ*, a native of tropical America. It bears a large, oblong fruit, containing numerous seeds, imbedded in a subacid edible pulp.

GRAN CHACO, an extensive region in the heart of South America, which belongs partly to Bolivia and partly to the Argentine Republic, the boundary between the two states coinciding with the parallel 22°. The area is estimated at about 425,000 square miles.

GRAND ARMY OF THE REPUBLIC, An organization composed of the survivors of the Union army in the Civil war, was first suggested, it is claimed, during 1864, by the Rev. W. J. Rutledge, chaplain of the fourteenth regiment of Illinois infantry. During the continuance of hostilities the formulation of plans looking to the establishment of a society of veterans was not attempted. In the winter of 1865-66 the matter was revived by ex-soldiers, and considerable correspondence was had in the premises. During February of the latter year, Dr. B. F. Stephenson, Maj. Robert M. Woods, and others representing Illinois regiments took the preliminary steps. A charter was obtained and on April 6, 1866, the pioneer post of the Grand Army of the Republic began its organic existence at Decatur, Ill., twelve members being mustered in by Doctor Stephenson.

It should here be stated that the society was designed to be a secret order and its proceedings were conducted accordingly.

On May 16th of the same year the constitution of the order, together with a declaration of principles, was printed and promulgated. The former sets forth the plan of organization and the latter the objects for which the society was specially created. Posts organized in a city, town, township, ward or precinct were to be known as precinct organizations; county organizations as district posts; State organizations as departments, and the national organization as "The Grand Army of the Republic." Each organization was to be under the direction of certain designated officers and was entitled to certain representation, each district being entitled to one delegate in the department organization which convened each year, while the national organization was to be composed of two delegates from each department. The declaration of principles was substantially as follows:

*First.*—To preserve and strengthen those kind and fraternal feelings which bind together the soldiers, sailors, and marines who united to suppress the late rebellion and to perpetuate the history and memory of the dead.

*Second.*—To assist such former comrades-in-arms as need help and protection, and to extend needful aid to the widows and orphans of those who have fallen.

*Third.*—To maintain true allegiance to the United States of America, based upon a paramount respect for and fidelity to the National constitution and laws; to discountenance whatever tends to weaken loyalty, incites to insurrection, treason and rebellion, or in any manner impairs the efficiency or permanency of our free institutions, and to encourage the spread of universal liberty, equal rights and justice to all men.

Some weeks later Post No. 2 of the Grand Army was instituted at Springfield with 27 charter members and the following officers: T. S. Mather, post commander; E. J. Johnson, adjutant; W. E. Fitzhugh, officer of the day; and William T. Prescott, quartermaster.

On July 12, 1866, the members of the Grand Army in Illinois met in convention at Springfield, at which time the principles set forth in the above declaration were re-affirmed and emphasized, and other proceedings were had, including the completion of arrangements for the organization of posts in other States. In pursuance of the latter the work of establishing branch organizations was entered upon and by November, 1866, departments were established throughout Illinois and the States adjoining, and posts in a number of the Eastern, Western and Southwestern States.

The first National Encampment of the Grand Army was held at Indianapolis, beginning November 20, 1866, Morrison's Opera House being appropriated to the uses of the society. At this meeting the National organization was perfected. No National Encampment was held in 1868, but each year since it has been convened with gratifying results.

To the efforts of members of the Grand Army, it is claimed, is due the general observance of May 30th of each year as "Decoration Day." In the spring of 1868, according to the records of the society, this matter was first considered, and on the 5th of May of the same year, General Logan, commander-in-chief, issued a general order in which "the 30th of May, 1868, is designated for the purpose of strewing with flowers or otherwise decorating the graves of comrades who died in defense of their country during the late rebellion, and whose bodies now lie in almost every city, village and hamlet church-yard in the land."

Ceremonies at and in the decoration of the graves of soldiers had been observed in various portions of the country previous to the issuance of the order above quoted, but united action in the premises was heretofore wanting. The day has since been annually set apart for the purpose of strewing with flowers the graves of both the Union and Confederate Soldiers who fell in the battles of the Civil war. In many of the States May 30th has been made a legal holiday.

The commanders-in-chief of the Grand Army and the place of holding the annual encampment at which each was elected, have been as follows:

1. Stepen A. Hurlbut, of Illinois, Indianapolis; November 20, 1866.

2. John A. Logan, of Illinois, Philadelphia; January 15, 1868; reëlected (3) at Cincinnati, May 12, 1869; and again (4) at Washington, May 11, 1870; died December 26, 1886.

5. Ambrose E. Burnside, of Rhode Island, Boston; May 10, 1871; reëlected (6) at Cleveland May 8, 1872; died September 3, 1881.

7. Charles Devens, Jr., of Massachusetts, New Haven, Conn.; May 14, 1873; reëlected (8) at Harrisburg, Pa., May 13, 1874.

9. John F. Hartranft, of Pennsylvania, Chicago; May 12, 1875; reëlected (10) at Philadelphia, June 30, 1876.



11. John C. Robinson, of New York, Providence, R. I.; June 26, 1877; reelected (12) at Springfield, Mass., June 4, 1878.

13. William Earnshaw, of Ohio, Albany, N. Y.; June 17, 1879.

14. Louis Wagner, of Pennsylvania, Dayton, O.; June 8, 1880.

15. George S. Merrill, of Massachusetts, Indianapolis; June 15, 1881.

16. Paul Vandervoort, of Nebraska, Baltimore; June 21, 1882.

17. Robert B. Beath, of Pennsylvania, Denver; July 25, 1883.

18. John S. Kountz, of Ohio, Minneapolis; July 23, 1884.

19. S. S. Burdette, of Washington, D. C., Portland, Me.; June 24, 1885.

20. Lucius Fairchild, of Wisconsin, San Francisco; August 5, 1886.

21. John P. Rea, of Minnesota, St. Louis; September 29, 1887.

22. William Warner, of Kansas City, Mo., Columbus, Ohio; September 13, 1888.

23. R. A. Alger, of Michigan, Milwaukee; August 17, 1889.

24. W. G. Veazey, of Vermont, Boston; August 1890.

The growth of the Grand Army has been continuous since the date of its inception as an organization, and the influence exerted by members, posts and departments has been potent and widely extended. It is represented by posts in every State and Territory at the North and in many of the Southern States. Constant additions have been made to the roster of members, "its strength and power" are said to be "commensurate with its numbers, now nearly half a million comrades." The objects for the promotion of which the Grand Army was created have been kept steadily in view and their attainment as steadily sought. Assistance is afforded members upon all proper occasions, and liberal appropriations have always been made in the cause of deserving charity. The organization claims to be in no sense a political factor and to require from members a strict observance of this rule.

Changes have been made in the constitution and laws of the association, as the occasion required, but little has occurred to disturb the harmony and good fellowship which has characterized the career of the organization.

GRAND'COMBE, a town of France, in the department of Gard and arrondissement of Alais, is situated on the Gardon. Population (1890), estimated at 6,500.

GRAND FORKS, the capital of Grand Forks county, North Dakota, and the center of the most productive wheat growing region of the Northwest, is situated at the head of navigation, on the Red River of the North, and on the Grand Forks division of the St. Paul, Minneapolis and Manitoba, and the Northern Pacific railroads. During the summer season steamers ply regularly between Grand Forks and Fargo, also between Grand Forks and Pembina. The city contains two daily, four weekly and one monthly publications, three national banks, a court-house, United States land office, three hotels and two public halls, besides churches, schools, stores, elevators and some lines of manufacture, principally lumber and lumber products, engines, boilers, etc. The population is 6,500.

GRAND ISLAND, capital of Hull county, Nebraska, is situated on the Platte river, 154 miles west of

Omaha. It is also on the Union Pacific, St. Joseph and Grand Island, and Burlington and Missouri River railroads. The country surrounding is highly productive and thickly settled. The city contains five banks, one daily and five weekly papers, eight hotels, an opera house, academy of music, public halls, churches of every denomination, high, intermediate and primary schools, and manufactures of machinery, cornices and ornamental iron. Population (1890), 15,000.

GRAND HAVEN, capital of Ottawa county, Michigan, is situated on Lake Michigan, at the mouth of Grand river, opposite Milwaukee, to which, as well as to the other principal towns on the lake, several steamers ply daily. It is a station of the Chicago and West Michigan, and the terminus of the Detroit, Grand Haven and Milwaukee line. It has one daily and three weekly papers, one national bank, a court-house, thirteen churches, a high school and graded schools, a number of fine hotels, and handsome private residences. It has saw and shingle mills, and manufactures of agricultural implements, of sashes and blinds, and of windmills. Shipbuilding is also carried on. In the neighborhood there are extensive peach orchards. Lumber and fruit are the principal shipments. Population (1890), 4,989.

GRANDIMONTANES, or GRAMMONTINES (*Ordo Grandimontensis*), a small religious order confined almost entirely to France. Its origin is involved in some obscurity.

GRAND RAPIDS, the county seat of Kent county, Michigan, has grown with great rapidity since its incorporation in 1850. It is situated on both sides of the Grand river, about forty miles from its mouth, and 153 miles west-northwest from Detroit. At this point the river, which is navigable above and below the rapids, has a fall of eighteen feet within a mile. This affords an excellent motive power, which has been generally utilized for manufacturing purposes. The city is the point of intersection of six railroads. Its manufactures include a great variety of woodenware, furniture, carriages, wagons, agricultural implements, machinery, chemicals, leather, beer, barrels and bricks, representing a capital of \$17,227,000, and producing an annual output worth \$32,432,000. Grand Rapids contains the United States courts for Western Michigan. It has five national and two other banks, first-class water supply, twenty-three public schools costing \$720,000, a city library containing 22,500 volumes, and a scientific institution, six daily and twenty weekly newspapers, and well organized police and fire departments. It is the seat of the Protestant Episcopal bishop of Western Michigan and contains sixty-nine churches. Among the prominent public buildings are the city-hall, court-house, soldier's home, masonic home, orphan asylum, post-office and other structures. The city is provided with gas and electric light plants, sixty-six miles of water mains, twenty-three miles of sewers, sixty miles of street railways. The assessed value of property was \$21,794,612 in 1890, and the city tax-rate for the same year was \$2.80 per \$100. Population (1890), 60,278.

GRANDSON. See GRANSON.

GRANDVILLE. See GERARD, JEAN I. I.

GRANET, FRANCOIS MARIUS, was born at Aix in Provence, on December 17, 1777; his father was a small builder, but the boy's own strong desires led his parents to place him in a free school of art directed by M. Constantin, a landscape painter of some reputation who lived in the town. In 1793 Granet followed the volunteers of Aix to the siege of Toulon, at



the close of which he obtained employment as a decorator in the arsenal. While yet a lad he had, at Aix, made the acquaintance of the young Comte de Forbin, and it was upon his invitation that Granet, in the course of the year 1797, proceeded to Paris. De Forbin was one of the pupils of David, and Granet entered the same studio. Later on he got possession of a cell in the convent of Capuchins, which, having served for a manufactory of assignats during the revolution, was afterward inhabited almost exclusively by artists. In the changing lights and shadows of the corridors of the Capuchins, Granet found the materials for that one picture to the painting of which, with varying success, he devoted his life. In 1802 he left Paris for Rome, where he remained until 1819, when he returned to Paris, bringing with him, besides various other works, one of fourteen repetitions of his celebrated Chœur des Capucins, executed in 1811. The figures of the monks celebrating mass are taken in this subject as a substantive part of the architectural effect, and this is the case with all Granet's works, even with those in which the figure subject would seem to assert its importance, and its historical or romantic interest. He became member of the Institute in 1830; but in spite of these honors, and the ties which bound him to M. de Forbin, then director of the Louvre, Granet constantly returned to Rome. After 1848 he retired to Aix, immediately lost his wife, and died on November 21, 1849.

GRANGERS, a secret society composed of farmers, and properly known as "Patrons of Husbandry." The organization grew out of the depressed condition of agriculture following the war and the financial panic of 1873. It was formed in Washington, D. C., in December, 1867, by seven persons, chief of whom was O. H. Kelly, a clerk in United States Department of Agriculture. The original scheme contemplated National, State, and local granges, to which both men and women should be eligible for membership. As usual a ritual with passwords and grips was provided. This movement was at first largely social, politics being left out professedly. Some attempts were made to establish coöperative stores, and there was a strong endeavor in various ways to carry out the motive idea of making the agriculturist largely a man independent of all other occupations. Journals were established devoted to the interests of the order, which attained a membership of more than a million.

But it is now seen that the organization of Patrons of Husbandry was inadequate to allay a widely-spreading discontent among the farming class, and the society declined, the feeling which organized it taking a much deeper tone, with a steady drift toward an organization declaredly radical and political. This feeling, growing continually, was in favor of excluding from membership with the farmers of all professional persons not farmers, and thus the old politicians who are ever desirous of using a public sentiment for personal advantage. About 1889 it began to be known that an organization existed known as the "Farmers' Alliance," whose purposes were not social, and whose aims were radical and undisguisedly political. Two years later this organization began to be known as the Populist Party—the party of the People. It opposes *all* other parties, refuses to recognize the politicians and politics of these parties, and creates them anew for itself as emergencies arise.

This organization became fairly strong in two or three of the northwestern States, and was presumably so in the South, but was especially active in Kansas, from which, as the first effort of the party, a Senator and a majority of representatives were elected to congress. This strength was a surprise to the dominant party,

which surprise was not abated by the election of governor and the State officers, with a disputed majority in both houses of the Legislature, in November, 1892. This state of affairs culminated in violence during the session of the Legislature of the winter of 1892-93, the republicans being blockaded and besieged in the Hall of Representatives at Topeka, the militia being called out by the governor, but virtually refusing to act, crowds of armed citizens flocking to the scene from all parts of the State, but finally a compromise without violence and a finishing of legislative business, being incidents of the occasion.

The causes of the rebellion of the farmers against all the old parties are complicated and many, but are chiefly to be traced to a dissatisfaction in respect to railroad oppressions and commercial trusts.

GRANITE, a rock so named from the Latin *granum*, a grain, in allusion to the granular texture of many of its varieties. The term appears to have been introduced by the early Italian antiquaries, and it is believed that the first recorded use of the word occurs in a description of Rome by Flaminius Vacca, an Italian sculptor of the sixteenth century. Granite is also referred to by Cæsalpinus (1596), and by Tournefort (1698); indeed the latter has been cited by Emmerling as the first author who uses the term. By these early writers, however, the name was loosely applied to several distinct kinds of granular rock, and it remained for Werner to give it that precise meaning which it at present possesses as the specific designation of a rock.

Granite is a crystalline-granular rock consisting, in its typical varieties, of orthoclase, quartz, and mica, to which a plagioclastic felspar is usually added. These minerals are aggregated together without the presence of any matrix or connecting medium. Thin sections of a true granite, examined under the microscope, by transmitted light, show no trace of any amorphous or crypto-crystalline ground mass. The chemical composition of the rock will, of course, vary with its mineralogical constitution. The proportion of silica varies from 62 to 81 per cent. Granite belongs therefore to Bunsen's class of *acid* rocks, or those which contain more than 60 per cent. of silica.

Orthoclase, or potash felspar, is the principal constituent of most granites. This mineral occurs either in simple crystals, or in twains formed on what is known as the "Carlsbad type," such crystals being common at Carlsbad in Bohemia. The green felspar known as Amazon stone, which occurs in certain granites, has lately been shown by Des Cloiseaux to belong to the species *microcline*, and not, as previously supposed, to orthoclase. The plagioclastic, anorthic, or triclinic felspar of granite occurs in crystals which are generally smaller than those of the orthoclase, and which exhibit, even to the naked eye, their characteristic twin striation. Moreover the luster is frequently resinous or fatty, while that of the orthoclase is pearly on the cleavage-planes. In most cases the plagioclase is the soda-line felspar called *oligoclase*; but in some granites it is *albite* or soda felspar, as shown by Haughton in many of the Irish and Cornish granites. When a granite becomes weathered, the felspar may decompose into *kaolin* or *china-clay*; the commencement of this alteration is indicated under the microscope by the turbidity of the felspar, by the ill-defined edges of the crystals, and in the case of plagioclase by disappearance of the characteristic striæ.

The quartz of granite occurs generally in irregularly-shaped angular grains; but occasionally in distinct crystals which are double hexagonal pyramids with or without the corresponding prism. Colorless quartz is most common, but gray, brown, or bluish varieties also



occur. Whatever its color, it is as a rule transparent in microscopic sections, though sometimes rendered milky by the presence of vast numbers of minute cavities containing liquid. In many granites the quartz fills up the spaces between the crystals of felspar and of mica, and receives impressions from these minerals.

Few questions have been more warmly discussed than the origin of granite. When this rock is found forcing its way through older rocks, and appearing at the surface in large bosses from which veins are sent forth in all directions, there can be little doubt of its eruptive character. The small width of some of these granitic veins, or apophyses, suggests that the rock must have existed in a condition of perfect fusion or complete liquidity, and not simply as a viscous paste, before it could have been injected into such narrow fissures as those which are now occupied by granite. In many cases, the rocks which are penetrated by the granitic veins are altered in such a manner as to indicate a considerable elevation of temperature; a limestone in the neighborhood of the veins may become saccharoidal, and shales may become indurated or even converted into hornstone, while new minerals are often developed in the vicinity of the intruded veins. In these veins the granite is apt to change its mineralogical constitution, becoming either fine-grained or felsitic, or even reduced at the extremities of the vein of quartz. From the days of Hutton it has been generally admitted that most granite is of igneous origin. Since it appears to have been solidified at great depths beneath the surface, it has been distinguished as a *plutonic* rock, while those eruptive rocks which have risen to the surface, and have there consolidated, are termed *volcanic* rocks. The older geologists regarded granite as the primitive rock of the earth's crust, forming the floor of all stratified deposits and the nucleus of mountain chains. Such a view, however, has been long exploded. It is known indeed that granite, so far from being in all cases an original rock, may be of almost any geological age. Some is undoubtedly as old as the Silurian period, while other granites are certainly as young as the Tertiary rocks, and perhaps of even more recent date. By many field-geologists granite has of late years been regarded as a metamorphic rather than as a truly igneous rock. Metamorphism, however, is a term which has been so vaguely used that most of our eruptive rocks may, in a certain sense, be said to be metamorphic. Still, in the case of granite, it has often been pointed out that a passage may be traced from this rock into gneiss, and that gneiss itself may be regarded as an altered sedimentary rock.

GRANMICHELE, or GRAMMICHELE, a market town of Sicily, in the province of Catania, about eight miles from Caltagirone on the road to Catania.

GRANSON, GRANDSON, or GRANDSEE, a small town in Switzerland, canton of Vaud, is situated near the southwestern extremity of the Lake of Neuchâtel. It possesses the ruins of an old castle, containing a collection of antiquities, and has a very ancient church, once connected with a Benedictine abbey, with a number of pre-Christian images, but has fallen into decay. The town is of Roman origin.

GRANT, MRS. ANNE, a Scottish authoress, generally known as Mrs. Grant of Laggan, was born at Glasgow, February 21, 1755. In 1779 Anne married the Rev. Mr. Grant of Laggan, near fort Augustus, Inverness, and on his death, in 1801, she was left with a large family and only a very small income. It being known to several of her friends that she occasionally wrote verses, a proposal was made that she should publish a volume of poems, and names of as many as 3,000

subscribers were obtained. The volume appeared in 1803 under the title of *Original Poems, with some Translations from the Gaelic*, and met with a rather favorable reception, on account of its easy versification and the truth and tenderness of the sentiment of some of its smaller pieces. In 1806 she published *Letters from the Mountains, being a Selection from the Author's Correspondence with her Intimate Friends from 1773 to 1804*, which, by its spirited descriptions of Highland scenery, character and legends, awakened a large amount of interest. Her other works are *Memoirs of an American Lady, with Sketches of Manners and Scenery in America as they existed previous to the Revolution* (1808), containing reminiscences of her stay with Mrs. Schuyler, the lady with whom she spent four years of her childhood in America; *Essays on the Superstitions of the Highlanders of Scotland* (1811); and *Eighteen Hundred and Thirteen, a Poem* (1814). She died November 7, 1838.

GRANT, SIR FRANCIS, an English portrait painter, and president of the Royal Academy in London, was the fourth son of Francis Grant of Kilgraston, Perthshire, and was born at Edinburgh in 1803. On completing a course of instruction he removed to London, and as early as 1843 exhibited at the Royal Academy. At the beginning of his career he utilized his sporting experiences by painting groups of huntsmen, horses, and hounds; and doubtless if he had chosen to devote himself to the careful treatment of this class of subjects his success might have been more thorough and permanent, if less brilliant and lucrative, than it was. If, however, the reputation he acquired as a fashionable portrait-painter was aided by his social position and gentlemanly manners, it rested also on certain special artistic qualifications. The first and chief of these, was his power of thoroughly reproducing the outward tone and manner of fashionable life, or, as Sir Walter Scott called it, his "sense of beauty derived from the best source, that is, the observation of really good society." If also his execution was superficial and thin, it was bright, clear, facile, and unconstrained. In drapery he had the taste of a connoisseur, and rendered the minutest details of costume with felicitous accuracy. In female portraiture he achieved considerable success, although rather in depicting the highborn graces and external characteristics than the true and individual personality. In 1842 he was elected an associate, and in 1851 an Academician; and in 1866 he was chosen to succeed Sir C. Eastlake in the post of president. Shortly after his election as president he received the honor of Knighthood, and in 1870 the degree of D.C.L. was conferred upon him by the university of Oxford. He died October 5, 1878.

GRANT, SIR JAMES HOPE, an English general, brother of the preceding, was born July 22, 1808. In 1842 he acted as brigade-major to Lord Saltoun in the Chinese War, and specially distinguished himself at the capture of Chin-Keang, after which he received the rank of major and was nominated companion of the bath. In the first Sikh War of 1845-46 he took part in the battle of Sabraon; and in the Punjab campaign of 1848-1849 he held command of his old regiment, the Ninth Lancers, and won high reputation in the battles of Chillianwalla and Gugarat. In 1854 he became brevet-colonel, and in 1856 brigadier of cavalry. He took a leading part in the suppression of the Indian mutiny of 1857, holding for some time the command of the cavalry division, and afterward of a movable column of horse and foot. After rendering valuable service in the operations before Delhi and in the final assault on the city, he directed the victorious march of the cavalry and horse artillery dispatched in the direction of Cawnpore to open up communication with the commander-



in chief, Sir Colin Campbell, whom he met near the Alumbagh, and who raised him to the rank of brigadier-general, and placed the whole force under his command during what remained of the perilous march to Lucknow for the relief of the residency. In 1859 he was appointed to the command of the British land forces in the united French and British expedition against China, whose object was accomplished three months subsequent to the landing of the forces at Peh-tang, August 1, 1860, Pekin having surrendered at discretion after the Chinese army had thrice suffered defeat in the open and the Taku forts had been carried by assault. For his conduct in this war he received the thanks of parliament, and was gazetted G.C.B. In 1861 he was made lieutenant-general and appointed commander-in-chief of the army of Madras; on his return to England in 1865 he was made quartermaster-general at headquarters; and in 1872 he was transferred to the command of the camp at Aldershot. In the same year he was gazetted general. He died at London, March 7, 1875.

GRANTHAM, a municipal and parliamentary borough and market-town of England, county of Lincoln, is situated on both sides of the Witham, at the junction of several railways, one hundred and five miles north-northeast of London and twenty-two miles south-southwest of Lincoln. Population, 15,000.

GRANVELLA, ANTOINE PERRENOT, CARDINAL DE, one of the ablest and most influential of the princes of the church during the great political and ecclesiastical movements which immediately followed the appearance of Protestantism in Europe, was born August 20, 1517, at Ornans, Burgundy, where his father, Nicolos Perrenot de Granvella, who afterward became chancellor of the empire under Charles V., was at that time engaged in practice as a junior at the provincial bar. On the completion of his studies in law at Padua, and in divinity at Louvain, he for a short time held a canonry at Besançon, but his talents had already marked him for a higher sphere, and he was promoted to the bishopric of Arras when barely twenty-three (1540). One of his specially noteworthy performances was the settlement of the terms of peace after the defeat of the Smalkaldic league at Mühlberg in 1547, a settlement in which, to say the least, some particularly sharp practice was exhibited. In 1550 he succeeded his father in the offices of secretary of state and chancellor of the empire; in this capacity he attended Charles in the war with Maurice, accompanied him in the flight from Innsbruck, and afterward drew up the treaty of Passau (August, 1552). In the following year he conducted the negotiations for the marriage of Mary of England and Philip of Spain, to whom in 1555, on the abdication of the emperor, he transferred his services. In April, 1559, Granvella was one of the Spanish commissioners who arranged the peace of Cateau Cambrésis, and on Philip's withdrawal from the Netherlands in August of the same year he was appointed prime minister to the regent, Margaret of Parma. In 1560 he was elevated to the archiepiscopal see of Malines, and in 1561 he received the cardinal's hat. In 1564 he retired to Franche Comté. Nominally this withdrawal was only of a temporary character, but it proved to be final. The following six years were spent in comparative quiet, devoted chiefly to study; but in 1576 Granvella, at the call of Philip, resumed public life by accepting a mission to Rome as representative of the interests of Spain in framing the proposed treaty of alliance with Venice and the papal see against the Turks. In the same year he was advanced to the viceroyalty of Naples, which for five years he occupied with ability and success. Summoned to Madrid in 1575, to be president of the supreme council of Italy, and afterward of that of Castile, he still con-

tinued to find ample scope for his rare aptitudes. Among the more delicate negotiations of his later years were those of 1580, which had for their object the ultimate union of the crowns of Spain and Portugal, and those of 1584, which resulted in a check to France by the marriage of the Spanish infanta to Duke Philip of Savoy. In the same year he was made archbishop of Besançon, but never was enthroned, and died at Madrid September 21, 1586.

GRANVILLE, a fortified seaport town of France, department of Manche, is situated at the mouth of the Bosq and at the foot of a steep rocky promontory projecting into the English Channel, thirty miles southwest of St Lô. Population 13,000.

GRANVILLE, JOHN CARTERET, EARL, English statesman, son of George, Lord Carteret, was born April 22, 1690, and in his fifth year succeeded to his father's title. Soon after taking his seat in the House of Lords in 1711, he began to distinguish himself by his eloquent advocacy of the Protestant succession, and his zeal was rewarded when George I. came to the throne, by the appointment in 1715 of bailiff of the island of Jersey, and in 1716 of lord-lieutenant of Devon; and his mother was also created countess of Granville. In 1719 he was sent on an embassy to Sweden; and in 1720 he was named ambassador-extraordinary to the congress of Cambray. In May of the following year he was appointed secretary of state under Walpole's administration; but Walpole's jealousy of his influence with the king led to his resignation on April 3, 1724, and on the same day he was appointed lord-lieutenant of Ireland, an office which he held till 1730, when differences with the ministry led to his resignation. After his return he became the leader of the opposition. In 1742 he was at last successful in overthrowing Sir Robert Walpole's Government, and was immediately thereafter appointed secretary of state. He now obtained a complete ascendancy over the mind of George II., whose German policy he carried out irrespective of the opinions of his colleagues; but his imperiousness soon gained him both their enmity and the hatred of the people, and enabled his opponents, for whom he cherished unmitigated contempt, to effect his political annihilation.

In 1744 he found it necessary, from the resignation of his colleagues and his inability to find proper successors, to tender his resignation; and, according to Horace Walpole, he "retired from St. James' laughing." Shortly before this he had, by the death of his mother, become Earl Granville. His administration was popularly distinguished by the epithet "drunken"—a title which had reference to his character both as a politician and as a private individual. In 1749 he was created knight of the garter and appointed president of the council; but, though he retained his influence with the king, the part he thenceforth played in English politics was indirect and subordinate. He died January 2, 1763.

GRAPE. See VINE.

GRAPHITE. See CARBON and FURNACE.

GRAPHOTYPE is a name which has been given to an ingenious process of autographic engraving, by which typographic printing blocks are produced. The general principles of the process are as follows: A block of chalk or some similar material is reduced to a level surface, and on this surface a design is drawn with a glutinous ink, this ink being sufficiently fluid to penetrate some little distance into the porous chalk. The ink having become dry, gentle friction is applied to the surface of the block, so as gradually to rub away those parts of the chalk which are not indurated by the glutinous ink. The lines of the drawing being thus left in relief, a perfect model of the required printing block is obtained, and this model is next hardened by im-



ersion in a bath containing a solution of an alkaline silicate, after which it is dried and reproduced by the stereotype or electrotpe process. This method of typographic engraving was brought to a practical form and patented in 1860 by an American wood engraver, Mr. de Witt Clinton Hitchcock. The first step in his process is to reduce French chalk or talc to an extremely fine state of division by repeated grindings, elutriations and siftings, after which a layer of the material, rather over an eighth of an inch in thickness, is forced down upon, and made to adhere to, a thick zinc plate — the necessary pressure being obtained by means of an hydraulic press, the platen of which is faced with a polished steel plate, so as to communicate a good surface to the layer of compressed French chalk. The device is now drawn (of course, reversed) on the prepared block with an ink consisting of a weak solution of glue colored by lamp-black or some other pigment. In drawing on the prepared block care must be taken not to damage the somewhat tender surface of the compressed chalk, and the safest instrument with which to apply the glutinous ink is a fine sable brush, but an ordinary pen may be employed if the operation of drawing is performed with caution. A pad of silk velvet or a fitch brush may be used for rubbing the block so as to leave the lines in relief, and it is quite sufficient to continue the friction until a depth equal to the thickness of an ordinary playing card is produced — the spaces corresponding to any extended whites of the engraving being then cut out by means of a tool. A 10-per cent. solution of silicate of sodium may be used for hardening the block, and when dry, nothing remains but to take a mold from it and to reproduce it in metal.

GRASLITZ, or GRASSLITZ (Bohemian *Kraslice*), a town in the northwest of Bohemia, near the Saxon frontier, in the circle of Elbogen, eighty-eight miles northwest of Prague.

GRASSE, a town of France, capital of an arrondissement in the department of Alpes-Maritimes, twenty miles west of Nice.

GRASSES are monocotyledonous flowering-plants, possessing certain characters in common, and constituting the order *Gramineæ*. No plant is correctly termed a grass which is not a member of this family, but the word is in common language also used, generally in combination, for many plants of widely different affinities which possess some resemblance (often slight) in foliage to truly graminaceous species; e.g., knot-grass, cotton-grass, rib-grass, scorpion-grass, sea-grass. In agriculture the word has an extended signification to include the various fodder-plants, chiefly leguminous, often called "artificial grasses." Indeed, formerly *grass* (also spelt *gars*, *gres*, *gyrs*, in the old herbals) meant any green herbaceous plant of small size.

Grasses are the most universally diffused over the globe of all flowering-plants. There is no district in which they do not occur, and in nearly all they are a leading and dominant feature of the flora. In actual number of species *Gramineæ* comes considerably after *Compositæ* and *Leguminosæ*, the two most numerous orders of phanerogams, but in number of individual plants it probably far exceeds either; while from the wide extension of many of its species, the proportion of *Gramineæ* to other orders in the various floras of the world is much higher than its whole number of species would lead one to expect. This number can, however, scarcely be put much below 6,000, which is probably somewhat more than a fifth of all monocotyledons. This is only about  $\frac{1}{20}$ th of the phanerogams as a whole, yet in any given locality, with a very few exceptions, this proportion is largely exceeded. In tropical regions, where *Leguminosæ* is the leading order, grasses closely

follow as the second, while in the warm and temperate regions of the northern hemisphere, in which *Compositæ* takes the lead, *Gramineæ* again occupies the second position. As the colder latitudes are entered the grasses become relatively more numerous, and are the leading family in Arctic and Antarctic regions. The only countries where the order plays a distinctly subordinate part are some extra-tropical regions of the southern hemisphere, Australia, the Cape, Chili, etc.

The principal climatic cause influencing the number of graminaceous species appears to be amount of moisture; it is only in very dry countries that they become distinctly less numerous. A remarkable feature of the distribution of grasses is its uniformity; there are no great centers for the order, as in *Compositæ*, where a marked preponderance of endemic species exists; and the genera, except some of the smallest or monotypic ones, have usually a wide distribution. Speaking generally, however, the *Panicaceæ* are tropical and warm temperate plants, while the grasses of temperate and colder regions are members of the *Poaceæ*. The former are very sparingly represented in Europe by a few species of the vast tropical genera *Andropogon* and *Panicum*. *Poaceæ*, on the other hand, form a fair proportion of tropical *Gramineæ*, especially in the higher districts, where, as in the mountains of Abyssinia, are several endemic genera and many species. The largest tropical genus of *Poaceæ* is *Eragrostis*.

The native and cultivated forage grasses of the United States are of vast importance, and form a great proportion of the agricultural wealth of the country. Probably five hundred million dollars is not too high an estimate to put upon the annual value of the grass and hay crop. Among the most widely distributed of the American grasses is Timothy or Herd's-grass, said to have been first found in New York or Virginia, which is probably unsurpassed as a material for hay. It thrives best on moist loam, and not so well on light sandy soils. Red-top is often grown in connection with Timothy. Orchard grass, one of the most valuable of the pasture grasses, is preferred to almost any other by good judges. It grows rapidly and blossoms early. Meadow-Spear is a native American grass, and Meadow Fescue forms excellent pasture.

Of the rye grasses the Perennial and Italian varieties are favorites. Lucerne, originally found in Asia, is now cultivated in all temperate climes. It requires a rich soil and grows under favorable circumstances with great luxuriance. Under the name of Alfalfa it forms the chief grass crop of California. All the varieties of clover are in request for stock, and the Bluegrass of Kentucky is famous the world over. In Texas, and other Southwestern States, vast herds of cattle find sustenance in the native mesquite or bunch grass — having no other food the year around.

GRASSHOPPER, a collective term applied to certain orthopterous insects belonging to the families *Locustidæ* and *Acrydiidæ*, according to the now generally received classificatory views. They are especially remarkable for their saltatory powers, due to the great development of the hind legs, which are much longer than the others and have stout and powerful thighs, and also for their stridulation, which is not always an attribute with them of the male only. The distinctions between the two families may be briefly stated as follows:—the *Locustidæ* have very long thread-like antennæ, and four-jointed tarsi; the *Acrydiidæ* have short stout antennæ, and three-jointed tarsi. As the term "grasshopper" is almost synonymous with LOCUST, the subject will be more extensively treated under the latter heading. Under both "grasshopper" and "locust" are included members of both families above



noticed, but the majority belong to the *Acrydiidæ* in both cases.

GRASS VALLEY, a town of Nevada county, California, is situated on the Nevada County Narrow Gauge railroad, sixty miles northeast of Sacramento. One daily and two weekly papers are issued, and two banks are in operation. The city contains seven churches, a Roman Catholic cathedral, convent, and orphan asylum, together with schools, hotels, stores, two smelters, two foundries, and manufactures of lumber, tinware, etc. Population, 7,000.

GRATIANUS, AUGUSTUS, Roman emperor, son of Valentinianus I, was born in 359. In the ninth year of his age he received from his father the title of Augustus, but on his father's death in 375 he was compelled to share the Western empire with his infant brother, Valentinianus II., of whom he was appointed guardian, while his uncle Valens ruled over the Eastern empire. In 378 he gained a victory over the Alemanni near the site of the present town of Colmar. Through the death of Valens in the same year, there devolved upon him the government of the Eastern empire, but feeling himself unable to resist unaided the incursions of the barbarians, he ceded it to Theodosius, January 19, 379. By adopting as the guards of his person a body of the Alani, and appearing in public in the dress of a Scythian warrior, he awakened the contempt and resentment of his Roman troops. A Roman named Maximus took advantage of this feeling to raise the standard of revolt in Britain, and invaded Gaul with a large army, upon which Gratianus, who was then in Paris, being deserted by his troops, fled to Lyons, where, through the treachery of the governor, he was delivered over to one of the rebel generals and assassinated, August 25, 383.

GRATIANUS, FRANCISCUS, compiler of the *Concordia discordantium Canonum* or *Decretum Gratiani*, and founder of the science of canon law, was born about the end of the eleventh century at Chiusi in Tuscany, or, according to another account, at Carraria near Orvieto. In early life he appears to have been received into the Camaldulian monastery of Classe near Ravenna, whence he afterward removed to that of San Felice in Bologna, where he spent many years in the preparation of the *Concordia*. The precise date of this important work cannot be ascertained, but it contains references to the Lateran council of 1139.

GRATIUS FALISCUS, a Roman poet, contemporary with Virgil and Ovid, and author of a poem on hunting (*Cynegetica*), of which somewhat more than 536 lines have been preserved. Of his personal history nothing is known; but it has been doubtfully conjectured from his cognomen that he was a native of Falerii.

GRATTAN, HENRY, Irish statesman and orator, was born July 3, 1746. His father, a Protestant, was for many years recorder of the city of Dublin, and from 1761 to 1766 its representative in the Irish parliament; and his mother was a daughter of Thomas Marlay, chief justice of Ireland. Both at school and at Trinity College, Dublin, which he entered in 1763, young Grattan greatly distinguished himself, especially in the study of the classics. While still attending the university he discarded the Tory principles of his father, who, dying in 1766 before his irritation had time to moderate, testified his resentment by depriving him of the paternal mansion, and of all property not secured by settlement. Having inherited, however, a small inalienable patrimony he resolved to study for the bar, and in 1767 he entered the Middle Temple, London. He was called to the Irish bar in 1772, but never ob-

tained a large practice; and indeed from the time that he left the university he seems to have concentrated his attention chiefly on politics and the study of popular oratory. He early acquired a passionate admiration of the great orators of Greece and Rome, and while in London he spent the most of his evenings in the galleries of the House of Commons or at the bar of the Lords, anxious to profit by every opportunity of obtaining an insight into the art of eloquence, his enthusiasm for which had received additional stimulus from the genius of Lord Chatham. The knowledge obtained from the study of the best specimens of ancient and modern oratory, and that gained from witnessing the debates in the English parliament, Grattan began sedulously to apply to the purposes of his own discipline. By the constant practice of recitation to imaginary audiences, and by taking part frequently in private theatricals, he succeeded in overcoming to a remarkable extent his great physical defects, so as to acquire a clear and rounded articulation, an emphasis in some respects admirably consonant with his meaning, and a certain ease in a style of elocution which was effective partly by reason of its very singularity. At the same time, by practicing the habit of writing out the principal passages of his speeches, and submitting them to a constant mental revision, he attained to the possession of a diction which for clearness, epigrammatic vigor, polished beauty of phrase, and the power of illuminating a whole subject by sudden flashes of meaning conveyed in a single sentence, is unsurpassed in modern oratory. He was equally diligent also in perfecting his political knowledge by a careful study of the history and political constitution both of ancient and modern nations; and the minor accomplishment of proficiency as a pistol shot, at that time essential to every Irish politician who would be prepared for all emergencies, was cultivated by him with the same dogged perseverance which he displayed in other matters.

The period at which he began public life was one of the most critical in his country's history; and it is within the limits of strict truth to affirm that he inaugurated a new era in her political condition, and had a greater share than any other individual in determining her present relation to the United Kingdom. Through the writings of Molyneux and Swift, the beginnings of a true national sentiment had been previously awakened; and the first step in the path of constitutional reform had been taken, when by the advocacy of Flood the Octennial Bill of 1768 was passed, which limited the duration of parliament to eight years, instead of as formerly making their continuance depend upon the life of the sovereign; but Flood himself—whose friendship and influence were a powerful element in determining Grattan to adopt a political career—had, like less formidable agitators, succumbed to the intrigues of the "castle," and, although possessed of a private fortune which placed him beyond suspicion of being governed chiefly by mercenary considerations, had consented to hamper his political action by accepting a sinecure office; and it seemed as if the germs of a better future had already begun to rot in a soil of such political corruption.

In February, 1778, Grattan moved an address to the crown, to the effect that the condition of Ireland was no longer endurable, and, although the motion was supported by only a small minority, the discussion bore fruit in the same year by the concession of free export of all produce except woollens, and by the modification of the penal laws to the extent of allowing the Catholics to hold leases for 999 years. In the following year the volunteers by their determined attitude crowned with success his efforts, along with Flood and Burgh, to effect



the total repeal of the restriction Acts, and the same year saw also the repeal of the Test Act. With a view to increase and take advantage of the rising tide of national sentiment, Grattan, on April 19, 1780, moved his famous resolutions that the "king with the consent of the parliament of Ireland was alone competent to enact laws to bind Ireland, and that Great Britain and Ireland were indissolubly united, but only under a common sovereign;" but so satisfied was he with the tone of the debate that, unwilling needlessly to irritate or embarrass the English Government, he did not press his motion to a division. An agitation was, however, begun in the following year against Poyning's Act and the Mutiny Act, and Grattan besides supported the introduction of a bill permitting the Catholics to inherit and hold property on the same terms as other subjects. In order also to bring pressure to bear on the English Government, Grattan, Flood, and Charlemont met privately in the beginning of 1782, and drew up for the consideration of the volunteers' delegates two resolutions in reference to independence; and to these Grattan, on his own responsibility, and without the knowledge of Flood and Charlemont, added a third in favor of the measure for the relaxation of the penal laws against the Catholics. All these resolutions were adopted by the delegates unanimously, and Grattan, strong in armed support, repeated his motion for a declaration of independence, which, although it was lost, aroused such general enthusiasm that, when, on April 16th, he rose to move a Declaration of Rights, he in a brilliant oration congratulated his hearers and his country on the triumphant issue of the struggle, his first words being — "I am now about to address a free people." So completely did his eloquence rise to what was deemed the greatness of the occasion that its effect has seldom been equaled in the annals of oratory; and in the state of high-wrought excitement that prevailed, the government, then doubtful as to the result of the siege of Gibraltar by the French and Spaniards, did not dare to refuse the boon which had already been in reality appropriated without their permission, and on May 17th resolutions were passed unanimously, pledging the English parliament to redress the grievances complained of. In recognition of Grattan's services the Irish parliament was prepared to have voted him a grant of £100,000; but he was with difficulty persuaded to accept half that sum, and only agreed to do so from the consideration that, by relieving him from the necessity of practicing at the bar, it would enable him to devote the whole of his energies to politics. He determined, however, that this gift should not in any way bias his political action, and when Flood, supported by the volunteer convention, brought forward his motion for repeal, he at the expense of his popularity moved its rejection — a procedure which also gave rise to an extraordinary scene of mutual recrimination between the two orators. For the next ten years Grattan carried on the struggle for the reform of Irish abuses with almost no success; and his Place and Pension Bill, and bills to make the great officers of government responsible for their proceedings, to prevent revenue officers from voting at elections, and to abolish ecclesiastical tithes, were all rejected. At last, in 1793, parliamentary suffrage was conceded to the Catholics as a sop to the United Irishmen; but the concession served only to whet the appetite for further redress, and when the hope of obtaining this, after reaching the verge of certainty by the appointment of Fitzwilliam as lord-lieutenant, was suddenly dashed by his recall, the spirit of brooding discontent increased until ultimately it resulted in the bloody rebellion of 1798. Previous to its occurrence Grattan had withdrawn from parliament. In 1800 Grattan, though in feeble health, entered the Irish parliament as member for Wicklow, specially to oppose

the motion for union, a measure whose bitterness was not rendered less distasteful to him from the time, manner, and means employed for its accomplishment. He regarded its success as almost the nullification of Ireland's partial freedom, and the indefinite postponement of the attempt to remedy her wrongs. Though knowing from the beginning that to contend against the influence of the government was hopeless, he exerted all his eloquence in condemnation of the measure; and his last words in the Irish parliament were: "I will remain anchored here with fidelity to the fortunes of my country, faithful to her freedom, faithful to her fall." In the course of these debates Grattan was three times virulently attacked by Mr. Corry, chancellor of the exchequer, but at last retaliated with overwhelming effect. In the duel which followed Corry was wounded.

After the Union Grattan withdrew for a time from public life, but, in order to lend his assistance to the passing of the Catholic Relief Bill, he in 1805 entered the English parliament as member for Malton; and in the following year he was returned by Dublin, which he had formerly represented in the Irish parliament. Although his speeches in the new arena did not detract from his fame, the union had effected so great a change in his political standpoint that the inspiration which had formerly given to his eloquence such a glow of confident ardor, and had braced his powers to such supreme efforts, was no longer present. He refused to take office in the Fox ministry, but he nevertheless gave the Whigs his support on all important occasions; and by voting with the government on the Irish Insurrection Bill of 1807, he showed that his regard for the general welfare of the empire was unaffected by the great political disappointment of his life. After the rejection of the Catholic Relief Bill of 1813, which was accompanied by a clause reserving to the English sovereign the power of veto in the election of Catholic bishops, the Catholic board repudiated the proposed compromise and declined to intrust Grattan further with their cause. He, however, gave it the same energetic support as formerly, and after 1815 he never spoke in the English parliament on any other subject. In 1819 his motion was defeated by the small majority of two; and on the reassembling of parliament in the following May, he undertook, contrary to the advice of his physician, a journey to London in order again to bring forward the subject, but died a few days after his arrival, June 4, 1820. He received the honor of a public funeral and a grave in Westminster Abbey, where he lies near the tombs of Pitt and Fox.

GRATZ, or GRAZ, the capital of the Austrian crownland of Styria, is situated in the broad and fertile valley of the Mur, and the beauty of its position has given rise to the punning French description, *La ville des Graces sur la rivi re de l'Amour*. Pop. (1890), 90,000.

GRAUB NDEN. See GRISONS.

GRAUDENZ (Polish *Grudziadz*), a town of Prussia, chief town of a circle in the province of West Prussia, government district of Marienwerder, is situated on the right bank of the Vistula, which is here crossed by a railway bridge, eighteen miles south-southwest of Marienwerder, and forty miles north-northeast of Thorn.

GRAUN, CARL HEINRICH, a celebrated composer, was born May 7, 1701, at Wahrenbr ck in Saxony, the youngest of three brothers, all more or less musical. His father held a small post under government, but he gave his children a careful education. Graun's beautiful soprano voice was noticed at the school where he was educated, and soon secured him an appointment in the choir of the city of Dresden. He completed his studies under Schmidt, and profited much by the Italian operas which were performed at Dresden under Lotti, the



celebrated composer. After his voice had changed to a tenor, he made his début at the opera of Brunswick, in a work by Schurmann, an inferior composer of the day; but not being satisfied with the arias assigned him he re-wrote them, so much to the satisfaction of the court that he was commissioned to write an opera for the next season. This work, *Pollidoro* (1726), and five other operas written for Brunswick, spread his fame all over Germany. Other works, mostly of a sacred character, including two settings of the *Passion*, also belong to the Brunswick period. In the Italian operas he imitates the florid style of his time, but there also considerable dramatic power is occasionally shown in the recitative. Graun died on August 8, 1759, at Berlin, in the same house in which, thirty-two years later, Meyerbeer was born.

GRAVELINES, a fortified seaport town of France, in the department of Nord and arrondissement of Dunkirk, is situated near the mouth of the Aa, eleven miles southwest of Dunkirk. Population (1890), 5,000.

GRAVESEND, a municipal and parliamentary borough, river-port, and market-town in the county of Kent, England, is situated on the right bank of the Thames, opposite Tilbury Fort, thirty miles below London. Population (1890), 30,000.

GRAVINA, a city of Italy, in the province of Bari, is situated on a hill to the left of the river Gravina, seven miles from Altamura, and thirty-seven southwest of Bari. Population, 16,000.

GRAVINA, GIOVANNI VINCENZO, an Italian litterateur and jurisconsult, was born at Roggiano, a small town near Cosenza in Calabria, January 20, 1664. In 1689 he went to Rome, where in 1695 he united with several others of literary tastes in forming the Academy of Arcadians. A schism occurred in the academy in 1711, and Gravina and his followers founded in opposition to it the Academy of Quirina. From Innocent XII. Gravina received the offer of various ecclesiastical honors, but declined them from a disinclination to enter the clerical profession. In 1699 he was appointed to the chair of civil law in the college of La Sapienza, and in 1703 he was transferred to the chair of canon law. He died at Rome January 6, 1718. He was the adoptive father of Metastasio.

GRAVITATION. It is a matter of universal experience all over the earth that a heavy body tends to fall to the ground; and experience shows that, a body dropped from a point above the surface of the earth, always falls in a straight line, which is directed toward the center of the earth.

The familiar instance of the action of a magnet upon a piece of iron will suffice to illustrate what is meant by the word *attraction*. In virtue of certain properties possessed by the iron and the magnet, they are drawn together. The magnet draws the iron, and the iron draws the magnet. This particular kind of attraction is of a very special character. Thus, for example, the magnet appears to have no appreciable influence on a piece of wood or a sheet of paper, and has indeed no considerable influence on any known substance except iron.

By the attraction of gravitation, every body attracts every other body, *whatever be the materials of which each is composed*. In this we see a wide difference between the attractions of gravitation and that form of attraction which is known as magnetic attraction. Nor is the contrast between the *intensities* of these two different attractions less striking. The keeper of a magnet is drawn to the magnet by two different forces of attraction. The first of these is the gravitative attraction, which, so far as we know at present, would be equally exerted, whether the magnetism were present or

not. The second is the magnetic attraction. The latter is enormously greater than the former; in fact, under ordinary circumstances as to intensity and dimensions, the intensity of the attraction of gravitation will not be nearly so much as a millionth part of the magnetic attraction.

The intensity of the attraction of gravitation is indeed so small that, with one conspicuous exception, we can only become aware of its existence by refined and elaborate inquiries. That any two objects—for example, two books lying on the table—do actually attract each other, there can be no doubt whatever; but the intensity of this is so small that the attractive force can not overcome the friction of the table, and consequently we do not find that the books are drawn together. It has, however, been found that the intensity of the attraction of gravitation between two masses is directly proportional to the product of those masses. Hence, though the force is so small as to be almost inappreciable between two bodies of moderate dimensions, yet when the masses of the two bodies, or of even one of them, are enormously great, the intensity of the force will be sufficiently large to be readily discernible. In this way it is that the existence of the attraction of gravitation has been made known to us, and is, in fact, identified with our daily experience—indeed, with our actual existence. The mass of the earth is so enormous that the attraction of gravitation which exists between it and an object near the surface is readily appreciable. It is this attraction of gravitation between the earth and any object which constitutes that force which is referred to when we speak of the *weight* of the body. It is the attraction of gravitation which causes bodies to fall to the surface of the earth; and it is easy to show that the facts already presented with respect to the direction in which a falling body moves are readily explained by the supposition that the motions are due to an attractive influence exerted by the earth, or, to speak more correctly, to a mutual attraction subsisting between the earth and the body.

The time occupied by a body in falling to the surface of the earth, if dropped from a point above it, is independent of the mass of the body as well as of the materials of which the body is composed.

There are, no doubt, certain apparent exceptions to the generality of this statement. The law, as we have stated it, does surely not apply to the case of the balloon or a live bird. In each of these cases the air is made, directly or indirectly, to supply a force which overcomes the force of gravity and neutralizes its effects; but *if there were no air*, then the balloon and the bird would fall to the ground in precisely the same time as a fifty-six pound weight would do when dropped from the same height. It will not be necessary for us to introduce any further reference to the resistance of the air, and we shall discuss the phenomena presented by falling bodies as they would occur in a space from which the air has been removed.

Taking a given interval of time—for example, one second—we see that the height through which a heavy body will fall in one second depends neither upon the mass of the body nor on the materials of which it is composed. This is therefore a constant at any given place on the earth's surface for every description of body, and it is of fundamental importance to determine that quantity accurately. By an indirect method, founded on pendulum observations, it is possible to determine this quantity with far greater accuracy than would be attainable by actually making the experiment. The value as thus found is slightly different at different parts of the earth though constant at each one. It may be taken as 16.1 feet.



When the distance which the falling body moves over in the first second has been ascertained, it is possible to find the distance which will be accomplished in two seconds, or indeed in any number. The difficulty of the question arises from the circumstance that, as the velocity of the falling body is gradually increasing, the distance moved over in the second second is greater than it was in the first, and generally that the distance in any second is greater than the distance accomplished in any previous second.

By suitable contrivances it is possible to ascertain that a body dropped from rest will in a time of two seconds move over a space of 64.4 feet. We have already seen that during the the first second the body will fall 16.1 feet. It follows that in the second second the space described by a body falling freely from rest is  $64.4 - 16.1 = 48.3$ . It is thus obvious that the space described in the second second is three times as great as the space described in the first second. To what is this difference to be ascribed? At the commencement of the first second the body was at rest; at the conclusion of the first second the body had attained a certain velocity, and with this velocity the body commenced its motion during the second second. The total distance of 48.3 feet accomplished during the second second is partly due to the velocity possessed by the body at the commencement, and partly to the action of gravity during that second. By the principle just explained, we are able to discriminate the amounts due to each cause. It appears, from the experiments already referred to, that during the second second as during the first the effect of gravity is simply to make the body 16.1 feet nearer the earth than it could otherwise have been. But the body moves altogether 48.3 feet in the second second, and as the action of gravity during that second will only account for 16.1 feet, it follows that the residue, amounting to  $48.3 - 16.1 = 32.2$  feet, must be attributed to the velocity accumulated during the first second.

We are therefore led to the very important result that a body falling freely from rest will have acquired a velocity of 32.2 feet per second when one second has elapsed. It need not be a matter for surprise that, though at the close of the first second the velocity acquired is 32.2, the distance moved over during that second is only 16.1. It will be remembered that the body starts from rest, and that while in the act of falling its velocity is gradually increasing. The body, therefore, moves much further in the last half of the second than it did in the first half, and consequently the total distance traveled must be less than the distance which would have been accomplished had the body been moving during the whole second with the velocity acquired at its termination.

Our earliest knowledge of the law of gravitation is due to the researches of Sir Isaac Newton, who in the summer of 1666 began to investigate the subject. The story that he was led to do so by seeing an apple fall from a tree, rests on the authority of Voltaire. Kepler had proven that the planets revolve in an elliptical orbit around the sun, and Newton conjectured from the tendency of heavy bodies to fall to the earth, that the same cause retained the moon in its orbit round the earth. In 1684 Newton discussed the law of gravity with Sir Christopher Wren, Halley, and Hooke. At first it was supposed that the moon's orbit was a circle, but Newton discovered that it was an ellipse and so informed Halley. There was a dispute afterward as to how much credit Hooke was entitled to for his investigations, but the Royal Society settled that all the honor belonged to Newton.

GRAVITY, SPECIFIC. See HYDRODYNAMICS.

GRAY, the chief town of an arrondissement in the

department of Haute-Saône, is situated on the declivity of a hill on the left bank of the Saône, thirty-seven miles southwest of Vesoul by rail. Population (1890), 7,345.

GRAY, DAVID, Scottish poet, was the son of a handloom weaver, and was born at Merkland, about eight miles from Glasgow, January 29, 1838. His most intimate companion was Robert Buchanan, the now well-known poet; and in May, 1860, the two agreed to proceed to London, with the indefinite purpose of finding some kind of employment in connection with literature. Shortly after his arrival in London Gray introduced himself to Mr Monckton Milnes, now Lord Houghton, with whom he had previously corresponded, who, though unsuccessful in his application for a place for Gray's poem, *The Luggie*, in the *Cornhill Magazine*, gave him some light literary work. He also showed him great attention when a cold which had seized him assumed the serious form of bronchitis, and procured him the means of staying for a time in the south of England; but as the disease made rapid progress, an irresistible longing seized Gray to return to Merkland, where he arrived in January, 1861, and died on December 3rd following, having the day before had the gratification of seeing a printed specimen copy of his poem *The Luggie*.

GRAY, JOHN EDWARD, a distinguished English naturalist, born at Walsall, Staffordshire, in 1800, was the eldest of the three sons of Mr. S. F. Gray, of that town, druggist and writer on botany, author of the *Supplement to the Pharmacopœia*, etc., and grandson of Mr. S. Gray, who translated for Lee the *Philosophia Botanica* of Linnæus, and assisted in the composition of the *Introduction to Botany*. He was fifty years keeper of the British museum and died March 7, 1875.

GRAY, THOMAS, the author of the celebrated *Elegy written in a Country Churchyard*, was born in Cornhill, London, December 26, 1716. In the spring of 1739 Gray was invited by Horace Walpole to accompany him as traveling companion in a tour through France and Italy. They made the usual tour, and Gray wrote remarks on all he saw in Florence, Rome, Naples, etc. His observations on arts and antiquities, and his sketches of foreign manners, evince his admirable taste, learning, and discrimination. Since Milton, no such accomplished English traveler had visited those classic shores. In their journey through Dauphiné Gray's attention was strongly arrested by the wild and picturesque site of the Grand Chartreuse, surrounded by its dense forest of beech and fir, its enormous precipices, cliffs, and cascades. He visited it a second time on his return, and in the album of the mountain convent he wrote his famous Alcaic Ode. At Reggio the travelers quarreled and parted.

The immediate cause of the rupture is said to have been Walpole's clandestinely opening, reading, and re-sealing a letter addressed to Gray, in which he expected to find a confirmation of his suspicions that Gray had been writing unfavorably of him to some friends in England. A partial reconciliation was effected about three years afterward by the intervention of a lady, and Walpole redeemed his youthful error by a life-long sincere admiration and respect for his friend. From Reggio Gray proceeded to Venice, and thence traveled homeward, attended by a *laquais de voyage*. He arrived in England in September, 1741, having been absent about two years and a half. His father died in November, and it was found that the poet's fortune would not enable him to prosecute the study of the law. He therefore retired to Cambridge, and fixed his residence at the university. There he continued for the remainder of his life, with the exception of about two years spent in Lon-











don, when the treasures of the British Museum were thrown open. At Cambridge he had the range of noble libraries. In 1742 Gray composed his *Ode to Spring*, his *Ode on a Distant Prospect of Eton College*, and his *Ode to Adversity*,—productions which most readers of poetry can repeat from memory. He commenced a didactic poem, *On the Alliance of Education and Government*, but wrote only about a hundred lines. Every reader must regret that this philosophical poem is but a fragment. It is in the style and measure of Dryden, of whom Gray was an ardent admirer and close student. His *Elegy written in a Country Churchyard* was completed and published in 1751.

Gray died July 30, 1771, and was buried, according to his own desire, beside the remains of his mother at Stoke Pogis, near Slough in Buckinghamshire, in a beautiful sequestered village churchyard that is supposed to have furnished the scene of his elegy.

GRAYLING (*Thymallus*) are fishes belonging to the family of *Salmonidæ*, which resembles the vendace and gwyniad in having scales of considerable size, and a narrow mouth with very small teeth. They are distinguished by their large, wing-like, dorsal fin. Only a few species are known, which inhabit clear streams of the north of Europe, Asia and North America.

GRAZALEMA, a town of Spain, in the province of Cadiz, is situated on the great road from Cadiz to Ronda, sixty miles east-northeast of Cadiz. Pop. 7,000.

GRAZZINI, ANTONFRANCESCO, an Italian author, was born at Florence, March 22, 1503. Of his youth and education all record appears to be lost, but he probably began early to practice as an apothecary. In 1540 he was one of the founders of the Academy of the Humid (*degli Umidi*), and about forty-two years afterward he took a prominent part in the formal establishment of the more famous Accademia della Crusca. He died in 1583.

GREAT BRITAIN AND IRELAND, THE UNITED KINGDOM OF. See ENGLAND.

GREAT EASTERN, the largest ship ever built, was constructed on the Isle of Dogs, Eng., in 1853-56. Its dimensions were: Length, 692 feet; breadth, 118 feet; height, 70 feet. She had eight engines, with a capacity of 11,000 horse power; ten boilers, five funnels or chimneys, and six masts. The weight of the ship was estimated at 12,000 tons. She was utilized in laying the first Atlantic cable, but did not prove to be a profitable investment, and was broken up for junk in 1889.

GREAT FALLS, the capital of Cascade county, Montana, is situated on the Great Falls of the Missouri river. The water power available for manufacturing purposes is large, and the transportation facilities are complete and efficient. The city contains two smelting works, two lumber mills, an iron foundry and some manufactures of minor importance, four banks, two schools, four churches, one daily and one semi-weekly paper, police and fire departments, good water supply and sewers. Population, 5,000.

GREAT FALLS, a town in Strafford county, N. H., stands on the Salmon river and has extensive railroad connections. There is abundant water-power, which is used by woolen and cotton factories. The town has two newspapers, national and savings banks, and telegraph facilities. Population (1890), 5,500.

GREAVES, JOHN, a mathematician and antiquary, was born in 1602. He was educated at Balliol College, Oxford, and in 1630 was chosen professor of geometry in Gresham College, London. After traveling in Europe, he in 1637, visited the East, where he collected a considerable number of Arabic, Persic, and Greek manuscripts, and made a more accurate survey of the

pyramids of Egypt than any traveler who had preceded him. He died in 1652, leaving a number of important works on science.

GREBE, the generally accepted name for all the birds of the family *Podicipedidæ*, belonging to the group *Pygopodes* of Illiger, members of which inhabit almost all parts of the world. Some systematic writers have distributed them into several so-called genera, but, with one exception, these seem to be insufficiently defined. Grebes are at once distinguishable from all other water-birds by their very short body, and the peculiar structure of their feet, which are not only placed far behind, but have the tarsi flattened and elongated toes furnished with broad lobes of skin.

GRECO, EL. Domenico Theotocopuli, commonly called El Greco, was a native of Greece, where he was born about the year 1545. He appears to have studied art at Venice, where it is alleged that Titian was his master. The date of his removal to Spain is unknown; but in 1577 we find him at Toledo, engaged on one of his most admired paintings, that on the parting of the raiment of Jesus. In 1579, having been summoned, along with other artists of repute, by Philip II. to contribute to the decoration of the Escorial, he began to aim at greater originality of style with very unfortunate results. The first work in his new manner, having for its subject the martyrdom of St. Maurice, was executed in 1579; in this, as in all his subsequent productions, a dull ashen monotony of color combines with stiff and unnatural drawing to produce an effect which is at no time very pleasant, and is sometimes absolutely repulsive. He practiced sculpture and architecture as well as painting, and is said by Pancheco to have written with great learning and ability upon all these arts; none of his books, however, have come down to our time. He died at Toledo in 1625.

GREECE is a European kingdom, occupying the southern portion of the most easterly of the three peninsulas which Europe projects into the Mediterranean. By its own inhabitants it is called Hellas, as it was also in antiquity, and the name Greece, by which in one form or other it is known in most European languages, was given to it by the Romans, and was not used by any Greek writer, so far as we know, before Aristotle. Why the Romans called it so is an obscure point, but the most probable and usually accepted explanation is that they gained their first knowledge of the country from a tribe in the northwest of Greece who were called Græci, and that they accordingly gave the name of that tribe to the whole country. The name Greece or Hellas has been applied at different times to territory of widely different extent. At first Hellas denoted nothing but the spot in Thessaly where the tribe of Hellenes dwelt, and in later times, after Philip of Macedon obtained a seat at the Amphictyonic council, it meant the whole peninsula south of the Balkan mountains (*Hæmus*) including Macedonia and Thrace; but at the period of its greatest distinction it excluded these two regions, and was restricted to the part of the peninsula to the south of the Cambunian range and the islands of the surrounding seas. Its ancient limits, however, cannot be rigidly defined, for (1) its northern frontier seems never to have been precisely settled, some writers excluding Thessaly which was generally taken in, and others including part of Epirus which was generally left out; and (2) the name Hellas expressed not so much a geographical as an ethnological unity. It was the country of the Hellenes. Wherever Greeks settled there was Hellas, and a Greek colony in Sicily or Africa was thought to participate as essentially in all that constituted Hellas as either Attica or Lacedæmon. Still the name was usually applied to



the land which formed the geographical center of the race, of which the greatest length was 250 miles and the greatest breadth 180, and which had an area, exclusive of Epirus (4,690 square miles), but including Eubœa (1,410 square miles), of 21,121 square miles. This territory comprised (1) Northern Greece, all north of the Maliac (Zeitoum) and Ambracian (Arta) Gulfs; (2) Central Greece, extending from these gulfs to the isthmus of Corinth; (3) the peninsula of the Peloponnesus (Morea) to the south of the isthmus; (4) the following islands,—Eubœa (Negropont) in the east, the Ionian Islands in the Ionian Sea on the west, Crete and Cyprus in the south, and the Cyclades and Sporades across the mouth of the Ægean from the southeast headlands of Attica and Eubœa. Continental Greece—*i.e.*, all the country now specified, exclusive of the islands—consists of a series of natural cantons, hedged from one another and from the outer world by mountain ranges from 5,000 to 8,000 feet high, and so was almost by a physical necessity occupied in the times of its ancient political independence by seventeen separate states. These states, which are noticed separately under the special headings, were: Thessaly in North Greece; Acarnania, Ætolia, Locris, Doris, Phocis, Megaris, Bœotia, and Attica in Central Greece; and Corinthia, Sicyonia, Achaia, Elis, Messenia, Laconia, Argolis, and Arcadia in the Peloponnesus.

Modern Greece is of smaller extent, and its limits are strictly determined by the arrangement between Great Britain, France, Russia, and Turkey, concluded at Constantinople on July 21 [9th], 1832, which finally settled the question of frontier between Greece and Turkey. It left to Turkey the fertile Greek-speaking province of Thessaly and part of Acarnania, and fixed the northern boundary of Greece at a line running from the Gulf of Arta (Sinus Ambracius) to the Gulf of Volo (S. Pagasæus), keeping along the crest of the Othrys mountain range. The pass of Khlomo was to belong entirely to Greece, and the fort of Punta (Actium) at the southern head of the Gulf of Arta was to continue to belong to Turkey, though Greek vessels were required to have free entry into the gulf. The Ionian islands, consisting of Corfu (Corcyra), Paxo (Paxos), Santa Maura (Leucas), Cephalonia, Thiake (Ithaca), and Zante (Zacynthus) on the west coast of Greece, and Cerigo (Cythera) on the south, which had remained under British protectorate for fifty years, were voluntarily ceded by Britain to Greece in 1864, after the accession of king George. Modern Greece is 200 miles long from north to south, and 180 broad from east to west, and has an entire area of 24,977 square miles.

Its most obvious geographical peculiarity is its remarkable richness in mountains, bays, and islands, which give it unexampled natural defenses, unusual maritime facilities, and quite a peculiar variety of climate, vegetation, and scenery. In this respect it but gathers into a smaller page and expresses in distincter type the structural peculiarities of the continent to which it belongs. In the complexity of its make and the variety of its natural features Greece excels every country of Europe, as Europe excels every continent of the world. No part of Greece is forty miles from the sea or ten from the hills. Though not much more than half the size of Portugal, it has a coast-line greater than that of Spain and Portugal together, and that coast-line is broken everywhere into all manner of gulfs, and bays, and inlets, affording a rich supply of good natural harbors. The country is divided by its mountain chains into a number of independent parts, the capture of one of which by an enemy is but a single step toward possession of the whole. The small basins of arable land between these hills maintained comparatively isolated popula-

tions, on account of the difficulty of inland intercommunication, and naturally developed that individuality of character, that local patriotism, and that political independence, which marked the ancient Greek communities. And the great variety of pursuit, interest, and stimulus which the geographical features of the country created could not fail to conduce to the uncommon mental vigor, quickness, and versatility which the people exhibited. The Greeks, therefore, owed their greatness largely to the country it was their fortune to dwell in.

The modern Greeks are of very composite origin, yet are an extremely compact and homogeneous people. Out of more than two millions which constitute the present population of the country, only about 85,000 speak any other language than Greek, and only 20,000 profess any other religion than the Orthodox; and all draw well together, glorying with one another in the same memories of a common deliverance, and sharing in the same ambition of a great future. There are in the narrow bounds of Greece three distinct races, speaking different languages, wearing different costumes, observing different customs, and holding little social intercourse with one another. These races are the Greek, the Albanian, and the Wallachian. All three are probably much mixed in blood, and, in fact, the descent of each of them has been a very vexed problem in ethnology. But, on the whole, the suggestion of Freeman seems the most likely account of the matter—that, taking them all in all, these three races are the direct representatives of the three races which occupied Greek territory at the time of its conquest by the Romans. Since that time their blood has certainly been mingled with other elements, but still substantially the base of the modern Greek is the ancient Greek, the base of the modern Albanian is the ancient Illyrian, and the base of the modern Wallachian is the ancient Thracian.

Of these races the least numerous in Greece is the Wallachian or Roumanian. They are found chiefly in the mountainous regions in the northern parts of Greece, on the slopes of Othrys, in the neighborhood of Zeitoum, on the hills of Acarnania and Ætolia, and even so far south as the banks of the Bœotian Cephissus. They pursue a nomadic shepherd life, wear black shaggy *capotes* made to imitate sheep-skin, and speak Roumanian—a modified Latin—the language of their race, and also Greek, the language of the country. They belong to the Greek Church, and sometimes marry Greek girls, but almost never give their own daughters in marriage to Greeks.

The rest of the population, comprising the great bulk of it, are Greeks,—a people speaking the Greek language, practicing the Greek rite, and claiming descent from the ancient Greek race. This claim, which seems to rest naturally on the obvious evidence of language and feature, was warmly contested on historical grounds by Fallmerayer, who held that during the Slavonic occupation of the country the ancient Greeks were completely extirpated, and that the present inhabitants are merely Slavonians Byzantinized. But his arguments have been conclusively confuted by Hopf, Finlay, and others, and it may be said to be now universally admitted that, while the blood of the population contains a considerable Slav admixture, its base is still that of the ancient race of Hellas.

The national character of the Greeks is a matter upon which authorities take very contrary views, some idealizing them foolishly, and others depreciating them most unjustly. They seem to have the faults and the excellences of their famous ancestors. They have their quickness of parts and their moderation of character. They are inquisitive, full of mental activity, fond of



excitement, as keen for discussion as in the days of Plato, and as eager after novelty as in those of Paul. Their thirst for knowledge is indeed quite remarkable, as well as their aptness to learn. Boys will put themselves to any discomfort in order to get to school; students at the university never missed a day from their classes during the Revolution of 1863, but regularly attended the lectures with the arms of the national guard in their hands; and domestic servants are often found in spare hours learning their letters or doing their sums. They excel in fact, in astuteness, in — what Tuckerman calls the most distinctive thing about them — *finesse*, which degenerates often into cunning, the weapon of the weak, which could not fail to be forged under their long Turkish oppression. They are courteous and very sunny in disposition, and entirely strangers to melancholy, so that both suicide and insanity are unknown among them. They are the most temperate of Christian nations, and the chastest. Though they make a good deal of strong wine, they drink little, and they eat as sparingly as they drink. The common people live on one meal a day, and the richer on two. A little maize and vegetables steeped in oil make the staple fare. Their rate of illegitimacy is lower than that of any other European country, which may perhaps be ascribed to the fact that Greece is the only country in Europe where the males outnumber the females, and that this circumstance combines with the frugal habits of living of the people to encourage early marriages. In other countries from 3 to 22 per cent. of the births are illegitimate, in Greece only 1.40 per cent. are so. Two striking characteristics of the Greeks are their patriotism, — their local attachment to their country, which stands out in the stronger relief because it is a quality in which their neighbors the Turks are entirely wanting — and their love not only of liberty but specially of equality. They are in spirit the most democratic European nation. They have no nobility — as of old, to be a Greek is itself to be noble; and Mahaffy says that "every common mule-boy is a gentleman and fully your equal, sitting in the room at meals, and joining in the conversation at dinner;" and such is their jealousy of social superiorities that he was often told by Greeks that the only reason why they tolerated a foreign king was that they could not endure to be under one of themselves. It is the same temper as ostracized Aristides, and doubtless its springs largely from their vanity and egotism, which even the most favorable witnesses own to be among their prominent faults. They have a deep belief, which they take no pains to conceal, in their own superiority over other nations; and the point in which they conceive their superiority more especially to dwell is in their intellectual gifts.

The population of Greece was in 1889, 2,187,208. The islands are the most densely peopled portions of the kingdom, especially the Ionian Islands, which have a population of 231,174, or 229 to the square mile. In continental Greece the rate is only 59 per square mile, and in the Morea 89. Greece is more thickly peopled than any country of Europe, except Russia and Sweden. The population has doubled since 1832.

The kingdom of Greece is an hereditary constitutional monarchy, descending by primogeniture from male to male, female succession being only allowed in the event of the absolute failure of legitimate heirs male. The title of the sovereign at first (according to the convention of London, May, 1832) was king of Greece, but it was altered by the conference of London, August, 1863, to king of the Hellenes. The king attains his majority at eighteen years of age. Both he and the heir-apparent are required to belong to the Greek orthodox church, but a special exception is made for the present king,

who is a Lutheran. The king receives an annual income of £52,179, of which £40,179 comes from the civil list, and £12,000 from personal donations of £4,000 from each of the three protecting powers. He has a palace in Athens — built by Otho at a cost of £500,000 — and a summer residence at Corfu. The legislative power is shared by the king with a single chamber called the *boule*, — a house of representatives which is elected for four years by the people; its numbers cannot fall below one hundred and fifty.

For purposes of local government Greece is divided into sixteen nomarchies, under officers called nomarchs, whose duties correspond with those of the French prefects; the nomarchies are subdivided into eparchies, under eparchs, corresponding to French sub-prefects, and the eparchies are further subdivided into demarchies, under demarchs, or mayors. The demarchs are elected by the people for four years; the nomarchs and eparchs are elected by the government without fixed terms. The nomarchs are assisted in the administration of the province by a council elected by universal secret suffrage for four years, which manages the police, roads, and other local business, and imposes the assessments. The local accounts must be sent once a year to Athens, to be audited by a court of government officials.

Greece has an admirable legal system, which is the one good thing it has got from the Bavarians. It is based on the old Roman law, with modifications drawn from the Bavarian and French. Liberty of person and domicile is inviolate; no one can be apprehended, no house can be entered, and no letter can be opened, without a judicial warrant. Criminal and political offenses and delinquencies of the press are tried by jury. The commercial code is identical with that of France.

Crime is proportionately less common in Greece than elsewhere, for the people are more temperate, and, on the whole, more contented. The peculiar Greek crime is — or, as we may happily now say, was — brigandage, the form of robbery which is natural to a mountainous and thinly peopled country without roads. According to the latest consular reports, the country is at present completely free from brigands. But it will never be secure against their reappearance until it obtains good roads, which will operate against the brigands both by tending to increase the rural population and by affording better facilities for the capture of criminals.

The strength of the Greek army on a peace footing in 1889 was 26,118 men. The navy consists of two small ironclads, some gunboats and twenty-three torpedo-boats, which are manned by 3,000 men, raised, as a rule, by conscription, from the inhabitants of the coast, though volunteering is encouraged. The Greek flag is a white cross on blue ground — the Bavarian colors and the Greek cross.

The religion of the people and of the state is that of the Orthodox Greek Church. In fact, the Greek rite is not only the national religion, but perhaps the deepest and most creative factor in the nationality of Greece itself. Men of Greek blood who do not belong to the Greek Church do not identify themselves with the Greek people. The Moslems of Crete were the sternest oppressors the Greeks knew, and the Latins of Syros sided at the revolution with the Turks, yet both were of the purest Greek descent. And what makes the Greek and Skipetar and Wallach of the modern kingdom all equally Greek in their sympathies to-day is their common profession of the Greek rite. But all other religions are tolerated in Greece.

Popular education is widely diffused in Greece. It was the first care of the newly-liberated people, and has been jealously fostered ever since, till they have now an exceedingly complete national system of education,



which is perhaps the most striking product of the new kingdom.

Agriculture is still in its infancy. A larger proportion of its area is uncultivated than obtains in any country in Europe except Russia; but that is explained by the unusually large part of it which is occupied by mountains. We have no exact statistics since 1860, but then only one-seventh was under cultivation. Its entire area (exclusive of the Ionian Islands, not then part of it), was 45,699,248 stremmas—a stremma being a little over a quarter of an acre. Of these only 17,824,000 were capable of cultivation, and only 6,076,000 actually under it, and half of this amount is always fallow from their system of working it. There are about 400 miles of railway in operation.

The soil is, as a rule, light and thin. In many places there is great lack of rain and running water, but the people are expert in irrigation. The chief products are corn, wine, fruit and oil. Six different kinds of wheat are grown, producing, in a favorable season, as much as ten or thirteen returns, and after a dry spring from three to five. Good crops are got of rye, barley and maize; oats do not grow so well, and potatoes not at all. Pulse thrives everywhere, and rice is produced in the plains of Marathon and Argos, and in marshy land elsewhere. Cotton and tobacco have been introduced in our day, and give good returns.

Greece is still in want of one of the first requisites to agricultural prosperity—a resident proprietary. The modern kingdom began with almost no proprietors. Under the Turks two-thirds of the land belonged to the sultan, and became at the revolution simply national property, which the government has been selling ever since to private owners on more or less reasonable terms. The peasants are showing a passion for land, and save up to buy their crofts, and in this way a large class of small freeholders is being created, with what effect upon agriculture we have no means of yet determining.

The methods of cultivation in use are still primitive. Modern implements are not employed to any great extent, though their manufacture is carried on at Syra and the Piræus, and though even the steam plow has been actually introduced in Elis. The Greek plow is still that of Homer, which the husbandman carries about his croft on his shoulder, and which hardly does more than scrape the surface of the ground.

The early history of Greece is the first chapter in the political and intellectual life of Europe. In contrast with nations still in the tribal stage the Greeks have already the life of cities; in contrast with the despotic monarchies of the East they recognize the principle that no personal rule should be unlimited. From the first they appear as a people obedient to reason and to a native instinct of measure. In the political sphere this leads them to aim at a due balance of powers and tendencies in the state, at the definition of duties and the protection of rights. In the intellectual sphere it leads them to explore causes, to interpret thought in clear forms, to find graceful expression for the social feelings and sympathies. The historical interest of Greece does not begin therefore only at the point where details and dates become approximately certain, but with the first glimpses of that ordered life out of which the civilization of Europe arose. At a later stage the Greek commonwealths offer the most instructive study which the ancient world affords in the working of oligarchic and democratic institutions. Then, as the Roman power rises, culminates, and declines, Greek history assumes a new character and a new interest. From Alexander the Great dates the beginning of a modern Greek nation, one, not in blood, but in speech

and manners. Two main threads link together the earlier and later history of civilized man. One passes through Rome, and is Latin; the other passes through the new Rome in the east, and is Greek.

Six periods may be distinguished. I. The prehistoric period, down to the close of the great migrations. II. The early history of the leading states down to about 500 B.C. III. The Ionic revolt and the Persian wars, 502-479. IV. The period of Athenian supremacy, 478-431. V. The Peloponnesian War, 431-404, followed by the period of Spartan and then of Theban ascendancy, 404-362. VI. The reigns of Philip and Alexander, 359-323 B.C.

We first know the Hellenes as a race divided into two great branches, each with well-marked characteristics of its own,—*Dorians* and *Ionians*; while those who have been less affected by the special causes which produced these divergences from an earlier common type are regarded as forming a third branch, and are called collectively *Æolians*. Further, we hear of a people distinguished indeed from the Hellenes, yet apparently felt (as by Thucydides) to be not wholly alien from them,—a people represented as having been before them in Greece proper, on the coasts, and in the islands of the *Ægean*,—the *Pelagians*.

The highlands of Phrygia have the best claim to be regarded as the point of departure for the distinctively Hellenic migrations. In these fertile regions of north-western Asia Minor, the Hellenes, after the Italians had left them, may have lived, first as a part of the Phrygian nation, and afterward as a separate people. From these seats a great wave of migration seems to have carried over the Hellespont into Europe a population which diffused itself through Greece and the Peloponnesus, as well as over the coasts and islands of the archipelago. In after ages, when the kinship, though perhaps dimly suspected, was no longer recognized, the Hellenes called these earlier occupants of the land *Pelagians*.

The second epoch of migration from the Phrygian highlands appears to have been one by which single Hellenic tribes, with special gifts and qualities, were carried forth to become the quickeners of historic life among inert masses of population, among those "*Pelagians*" who had long been content to follow the calm routine of husbandmen or herdsmen. The ancestors of the Ionians went down to the coasts of Asia Minor, and became the founders of a race whose distinctive powers found scope in maritime enterprise and in commerce. The ancestors of the Dorians passed into the highlands of Northern Greece, and there developed the type of hardy mountaineer which united the robust vigor of hunter and warrior with a firm loyalty to ancestral traditions in religion and in civil government.

Of these two branches,—the Ionian and the Dorian,—the Ionian was that which most actively influenced the early development of Greece.

Two periods of Phœnician influence on early Greece may be distinguished: first, a period during which they were brought into intercourse with the Greeks merely by traffic in occasional voyages; secondly, a period of Phœnician trading settlements in the islands or on the coasts of the Greek seas, when their influence became more penetrating and thorough. It was probably early in this second period—perhaps about the end of the ninth century B.C.,—that the Phœnician alphabet became diffused through Greece. This alphabet was itself derived from the alphabet of the Egyptian hieroglyphics, which was brought into Phœnicia by the Phœnician settlers in the Delta. The direct Phœnician influence on Greece lasted to about 600 B.C. Commerce and naviga-



tion were the provinces in which the Phœnician influence, strictly so called, was most felt by the Greeks. In art and science, in everything that concerned the higher culture, the Phœnicians seem to have been little more than carriers from East to West of Egyptian, Assyrian or Babylonian ideas.

The legends of European Greece speak clearly of foreign elements in civilization and in religious worship which came in from the East. But they do not constrain us to suppose that those who brought in these new elements were always, or as a rule, strangers to the people among whom they brought them. On the contrary the myths constantly say, or imply, that the new comers were akin to the people among whom they came; as the sons of Ægyptus are first cousins to the daughters of Danaus; as Cadmus and Pelops, though nominally of foreign origin, are thoroughly national heroes and founders. Hence it appears reasonable to conclude that the East by which European Hellas was most directly and vitally influenced was not the Semitic but the Hellenic East; that the Ionian Greeks of Asia Minor, after having themselves been in intercourse with Phœnicia and Egypt, were the chief agents in diffusing the new ideas among their kinsmen on the western side of the Ægean. Asiatic Greeks, who had settled among Egyptians in the Delta, or who had lived amid Phœnician colonies in Asia Minor, would easily be confounded, in popular rumor, with Egyptians or Phœnicians.

The appearance of new elements in religious worship is one great mark of the period during which Greece in Europe was still being changed by influences, Greek or foreign, from the East. The worship which the fathers of the Hellenes had brought with them from the common home in Asia was the worship of the "Heaven-father," the unseen father who dwells in æther, whose temple is the sky, and whose altar is most fitly raised on the mountain top, as the ancient shrine of the Arcadian Zeus was the grove on the summit of Mount Lycæus. This is the "Pelasgian Zeus, dwelling afar," to whom the Homeric Achilles prays. But as the united Hellenic race parted into tribes, so to the first simple worship of the Heaven-father was added a variety of local cults. And as mariners from other lands began to visit the coasts, they brought in their own gods with them. Thus Melcarth, the city-god of Tyre, is recognized in Melicertes as worshiped at the isthmus of Corinth. In one Greek form of the worship of Heracles, Astarte—the goddess of the Phœnician sailors—becomes Aphrodite, who springs from the sea. The myth of Adonis, the worship of the Achæan Demeter, are other examples.

Little precise knowledge of the earliest kingdoms and states can be extracted from the legends as they have come down to us, but some general inferences are warranted. The tradition that Minos cleared the archipelago of pirates and established a wide maritime dominion, that he was the first to sacrifice to the Charites, and that Dædalus wrought for him, may be taken at least as indicating that Crete played a prominent part in the early history of Greek culture, and that there was a time when Cretan kings were strong enough to protect commerce in the Ægean waters. Again, though Gordius and Midas have passed into the region of fable, there are reasonable grounds for the belief that the ancient kings of Phrygia once exercised dominion over Asia Minor. The Lydians, in whose origin Semitic and Aryan elements appear to have been mingled, have a twofold interest in this dawn of Hellenic history. First, they represent the earliest kingdom in Asia Minor of which anything is certainly known. Secondly, they are on land what the Phœnicians are on the sea, carriers or mediators between the Greeks and the East.

In the northwest corner of Asia Minor, a branch of Dardani—whose ancestor is described as worshiping the Pelasgian Zeus—founded the kingdom of the Troas, the land of Troy. It has been remarked that the double names of the Trojan heroes, Alexander, Paris, Hector, Darius, point to the twofold relationship of the Trojans, on the one side to Hellas, on the other to Asia. In European Greece we find the race known as the Minyæ, whose early glories are linked with the story of "Jason and the Argonauts" moving southward from the shores of the Gulf of Pagasæ into the valley of Lake Copais, and founding the Bœothian Orchomenus. The early greatness of Thebes is associated with the name of Cadmus, the king-priest who introduces the art of writing, who builds the citadel, who founds a system of artificial irrigation. The Achæan princes, whose chivalrous spirit is expressed in the Homeric Achilles, rule in the fertile valley of the Thessalian Phthiotis. In the Peloponnesus the Pelopidæ at Mycenæ reign over Achæans; and Agamemnon is said to rule, not only "all Argos," but "many islands."

We now come to a phase in the development of early Greece which tradition represents as following, but at no great interval, the age in which a Pelopid dynasty ruled at Mycenæ and fought against Troy. This is the period of great displacements of population within the mainland of European Greece. The first of these migrations is that of the people afterward known as Thessalians. The legend placed these events about 1124 B.C., or sixty years after the fall of Troy. About twenty years later in the mythical chronology occurs the third and more famous migration, known as the return of the Heraclidæ. The Achæans, driven from their old seats in the south, moved northward; and, reinforced by Æolic kinsmen from Bœotia and Thessaly, established themselves on the northwest coast of Asia Minor, where Lesbos and Cyme became their strongholds. By degrees their dominion spread inland, until they had become masters of Mysia and the Troad. The Æolic migration which thus created an Asiatic Æolis was unquestionably the slow work of generations. The immediate cause of the Ionic migration, which began later than the Æolic, appears to have been the overcrowding of Attica by the Ionians driven out of Achaia. The Æolic settlements had been the work of a people migrating in large masses. The Ionic colonization seems to have been effected rather by smaller numbers of warlike adventurers, sprung from the noble Ionian families of Attica and the Peloponnesus, who claimed to rule over the Ionic communities already established on the Asiatic coast. The Dorian colonists, following the southward direction of their previous conquests, settled on the southwest coast of Asia Minor. The Islands of Cos and Rhodes received Dorian settlers; and, after what was probably a long struggle, the Dorians subdued Crete.

While the populations had thus been settling down into the places which they were to occupy during the historical age of Greece, a movement had been in progress on the European mainland which tended to quicken among the various tribes a sense of the unity of the race. This was the establishment of local associations among neighboring tribes for the common worship of the same god. These associations were of a federal character: that is, while the members of the association were independent in other matters, they were subject to a common central authority in all that concerned religious worship. Such a federal association was called an *amphictyony*, that is, a *league of neighbors*. The most important of such leagues was the Delphic amphictyony, of which the object was to conserve the worship of Apollo at Delphi.



The Homeric poems may be regarded by the student of history as great pictures of political and social life, illustrating the whole variety of Greek experience down to the close of that age which saw the tides of Æolic, Ionic, and Doric migration flow from the west to the east of the Ægean. It is a distinct question how far recoverable historical fact is embedded in their text, or how far trustworthy inferences may be drawn from them in regard to a supposed series of events.

In the history of the Peloponnesus after the Dorian immigration we begin to be on firmer ground. There may still be large room for doubt as to particular dates or names, but the age left permanent records in the institution which survived it. The first thing which should be borne in mind with regard to the Dorian immigration is that its direct influence was confined to three districts of the Peloponnesus. Argolis, Laconia, and Messenia were thoroughly Dorianized. Of the other three districts, Arcadia remained almost wholly unaffected, Elis and Achaia were affected only indirectly, through the influx of the populations which the Dorians had displaced. The first rank in the Peloponnesus was long retained by Argos. Sparta was at first only one member of a Laconian hexapolis. It was at a later stage that Sparta became the head-town of the country, and the seat of a central government. The origin of the dual kingship may probably be traced to this period. Such dualism has no parallel elsewhere among Dorians; and, as regards one at least of the two royal lines, we know that the Agiade Cleomenes proclaimed himself an Achæan. The two royal lines of the Agiadæ and Eurypontidæ may have taken their beginning from a coalition or compromise between Dorian and Achæan houses. Afterward, when it was desired to explain the dualism and to refer both lines to a common source, Agis and Eurypon were represented as descended from the twin sons of Aristodemus, Eurystheus and Procles.

The spread of Spartan power in the Peloponnesus was preceded by the building up of that political and social system which made the Spartan citizens a compact aristocracy, exclusively devoted to the exercises of war. The personality of Lycurgus is shadowy. He has even been classed with those beings who, like Prometheus, Hermes, and Phoroneus, bestow on men that gift of fire without which they could not have attained to a high civilization. It is another question whether he was the author of all the institutions which were afterward ascribed to him. The example of another legislator who stands in a far clearer light of history — the Athenian Solon — whom the orators sometimes credit with the work of Clisthenes in addition to his own, may serve to show how loose such ascriptions often were. But at least the work of Lycurgus may be assumed to have marked an epoch in the history of the Spartan system.

The *Helots* cultivated the lands of the Spartans, not as slaves belonging to private masters, but as serfs of the commonwealth; hence no Spartan citizen could sell a Helot or remove him from the land. From each farm the Helots had to produce annually a certain quantity of barley, oil, and wine; if there was a surplus, they could keep it for themselves. The condition of the Helots was thus in some respects better than that of ordinary Greek slaves. But it was such as constantly to remind them that they had once been a free peasantry. It was this, as much perhaps as positive ill-usage, which made it so peculiarly galling. The hatred of the Helots was a standing menace to the Spartan commonwealth. As Aristotle says, the Spartan kingship meant practically a life-tenure of the chief military command. The government was essentially an official oligarchy,

in which the power of the irresponsible ephors was not importantly modified by the *gerousia*, while the popular assembly played a part hardly more active than that of the Homeric *agora*, with its formal privilege of simple affirmation or veto. The military training, from childhood upward, to which the whole social life of Sparta was made subservient, was at first a necessity; but it soon became thoroughly identified with the ambition and with the pride of an exclusive warrior-caste. Sparta was sharply marked off from the other Greek communities by this systematic treatment of war as the business of life. When the military prestige of Sparta began to decline in the course of the fourth century B.C., it was remarked that this was due to the increased attention which other states had begun to pay to the art of war, whereas in old days the Spartans had been like professional soldiers matched against civilians.

Myths have grown thickly around the story of the two Messenian wars. This, at least, appears certain: the gradual conquest of Messenia by Sparta occupied not less than a hundred years, (about 750-650 B.C.) Sparta was helped by Elis and Corinth. When Messenia had been conquered and the Dorian inhabitants reduced to the state of *Helots*, Sparta had overcome the most difficult obstacle to her ambition. By conquests, of which the details are obscure, she won from Argolis a strip of territory on the eastern coast of the Peloponnesus, and finally carried her northeastern border to Thyrea. In southern Arcadia alone the Spartan arms were decisively repulsed by Tegea; and the Tegeans, accepting the supremacy of Sparta, were enrolled, about 560 B.C., as honored allies of the power which they had checked.

The repulse warned Sparta that it was better to aim at leading the Peloponnesus than at conquering it; and an opportunity was found of asserting this leadership in a manner far more effective than any military demonstration. At Olympia, in the valley through which the Alpheus passes to the western coast, there was an ancient sanctuary of the Pelasgian Zeus. An *amphictyony*, or league of neighboring towns, held sacrifice and games there once in four years, the management of the festival being shared between Pisa and Elis. A dispute arose between these two states. Sparta confirmed Elis in the religious superintendence of the festival, and at the same time arrogated to herself the political headship of the sacred league. Every effort was now made by the Spartans to extend the popularity and enhance the brilliancy of the Olympic games. Sparta — already supreme in Laconia and Messenia, already the victorious rival of Argos in the east of the land — now appears at the Olympian shrine of Zeus in a character peculiarly well adapted to attract the loyalty of the western Achæans. The general recognition of Sparta as the first state in the Peloponnesus may be said to date from the time when, under Spartan auspices, the Olympic festival acquired a new celebrity.

The age of the oligarchies and tyrannies coincides with the most active period of Greek colonization, which received an impulse both from redundant population and from political troubles at home. The two centuries from 750 to 550 B.C. saw most of the Greek colonies founded. Sicily received settlements from both the two great branches of the Greek race. Naxos, founded by the Chalcidians of Eubœa (735 B.C.), with Leontini and Catana, founded soon afterward by Naxos, formed a group of Ionic communities on the eastern side of the island. Syracuse, founded by Corinth (734 B.C.); Gela, colonized by Rhodians and Cretans (690 B.C.), and Agrigentum, of which Gela was the parent city (582 B.C.), were among the chief of the Dorian commonwealths on the southeastern and southwestern coasts.



These Siceliot cities formed a fringe round the Siceli and Sicani of the interior; but, though in the presence of non-Hellenic populations, they never lost among themselves the sharp distinction between Dorian and Ionian (or "Chalcidic"), a distinction which was long the key-note to the inner history of the Siceliots. The earliest of the Greek settlements in Italy was the Ionic Cumæ, on the coast near Cape Misenum, a little to the northwest of Naples. It was founded by Chalcidians of Eubœa, as early, according to the tradition, as 1050 B.C. The Dorian Tarentum—a colony of Sparta—and the Achæan (Æolic) settlements of Sybaris and Croton, dated from the latter part of the eighth century B.C. Poseidonia (Pæstum) was founded by Sybaris. Locri, an Æolic settlement near Cape Zephyrium, and the Ionic Rhegium, founded from Chalcis, complete the series of flourishing cities which made southwestern Italy appear as a new and richer land of the Hellenes, as Megale Hellas, *Magna Græcia*. The turning point in its prosperity was the war between the two foremost of the Achæan cities, ending in the destruction of Sybaris by Croton, (510 B.C.) By this event, just at the time when the Ionians of Asia Minor were passing under the sway of Persia, the Greeks of Italy were rendered less able to make head against the native tribes of the peninsula. The name Megale Hellas remained, but its old significance was gone; the spirit of confident progress had been quenched.

When Attica first comes into the view of history, it already forms a single state of which Athens is the capital; the kingly period is over, and, though a close oligarchy still exists, there are signs of coming change.

The transition from monarchy to oligarchy was more gradual at Athens than it seems to have been elsewhere. First, the priestly office of the king was taken away; and, as the old name *basileus* implied religious as well as civil authority, he was henceforth called simply the ruler, *archon*. But the office of archon was still held for life, and was hereditary. The second step was to appoint the archon for ten years only. The third and last step was to divide the old regal power among nine archons appointed annually, (683 B.C.) The first archon, called Eponymos, because his name marked the date of official documents, had a general supervision of affairs, and in particular represented the state as the guardian of orphans and minors; the second archon was high priest (*basileus*); the third was commander-in-chief (*polemarch*); the remaining six were the custodians of the laws ("thesmothetæ"). After this reform, two events are the chief landmarks of Attic history before Solon. The first is the legislation of Draco, the second is the revolution of Cylon. Draco was commissioned, not to frame a new code, but to write down the laws as they existed in oral tradition. To a later age the laws of Draco became a proverb of severity; but their severity was that of the rude age from which they had come down, not of the man who was employed to tabulate them. By this code (620 B.C.), and by the establishment of a court of fifty-one judges in capital cases, the people were so far secured against abuse of the judicial office. But the existence of serious popular discontent a few years later is shown by the attempt of Cylon, (612 B.C.) Stimulated by the example of his father-in-law, Theagenes, the tyrant of Megara, he resolved to seize the supreme power at Athens. Promises of relief and of a new agrarian law gained him adherents among the distressed classes; but when he had succeeded in seizing the Acropolis, he found himself disappointed of popular support and surrounded by the troops of the archons.

Solon was now to come forward as the umpire of still graver issues. The influence of his ardent and lofty nature on the people is expressed in the legend

that his recitation of his elegy, "Salamis," fired them to strike the blow by which the "fair island" was won back from the Megarians.

The removal of the urgent pressure of usury, the substitution of wealth for birth as the canon of privilege, and the bestowal of strictly limited political power on the people were Solon's achievements. It is no proof of their inadequacy that they were soon followed by the appearance of a successful demagogue. The Attic population was locally divided into three classes—the Diacrii, or the "highlanders" of the northeast district (the poorest); the Parali, the boatmen and fishermen of the coast; and the "Pedieis," the richer farmers of the Attic plain. Each of these classes formed a political faction, with an ambitious noble at its head. The Diacrii were led by Pisistratus, the Parali by Megacles, the Pedieis by Lycurgus. On the pretense that he had been murderously assaulted by the enemies of the people, Pisistratus obtained a guard of fifty men. It was presently increased to four hundred. He then seized the Acropolis, (560 B.C.). After having being twice driven out by the combined factions of the Plain and the Shore, he finally established himself as tyrant in 545 B.C., and reigned till his death in 527 B.C. He did not abolish Solon's constitution, though he reserved some of the higher offices for members of his own house. His government appears to have been mild and wise. He set the example of submission to the laws. By many new enactments he promoted good order and morality. The convenience of the citizens and the beauty of Athens were consulted by the construction of new buildings, roads and aqueducts. There were but two things to remind Athenians that this paternal rule had been founded in force—the presence of hired troops and the levy of tithes on private lands. Pisistratus was succeeded by his eldest son Hippias. In 514 B.C. Hippiarchus, the brother of Hippias, was murdered by Harmodius and Aristogiton, in revenge for an affront offered to the sister of Harmodius. The rule of Hippias, which had hitherto resembled that of his father, now became cruel. The Alcæonidæ—who had been in banishment since the final return of Pisistratus in 545—had won the favor of the Delphic priesthood by an act of liberality. The temple at Delphi having been burned down, they had undertaken to rebuild it, and instead of common limestone, which would have satisfied the contract, used Parian marble for the east side of the temple. They now exerted their influence. Whenever Sparta or a Spartan consulted the oracle, the response always included a command to set Athens free. At last Cleomenes, king of Sparta, took the field. The children of Hippias fell into his hands, and to save them, Hippias voluntarily withdrew from Athens, (510 B.C.) The rule of the Pisistratid house was now at an end. In the phrase of the song which gave ill-merited glory to Harmodius and Aristogiton, Athens was once more under equal laws.

As a safeguard for the state against party struggles, it was provided that, if the Council and the Ecclesia should declare the commonwealth to be in danger, each citizen might be summoned to indicate by ballot the name of any man whom he thought dangerous, and that, if the same name was written on 6,000 tickets, the man so indicated should go into exile for ten years, without, however, losing his civic rights or his property. This was the institution of ostracism. Finally, choice by lot was substituted for voting in the election to the archonship, thus diminishing the danger of factious partisanship.

Isagoras, the leader of the party opposed to these reforms, had a zealous ally in Cleomenes, king of Sparta. Clisthenes, they alleged, was aiming at a tyranny such



as that of his grandfather and namesake at Sicyon. Sparta, the leading Dorian state, was in a manner the recognized champion of aristocracy against revolution. The Spartan herald summoned the Athenians to banish the accursed Alcmaeonidae, and Clisthenes voluntarily left Attica. Cleomenes arrived at Athens with his army. Isagoras was made archon; seven hundred "democratic" families were banished; the newly constituted council of five hundred was dissolved. But now the people rose in arms. Cleomenes and Isagoras were besieged on the Acropolis. On the third day of the siege they surrendered. Cleomenes and his troops were allowed to withdraw. Isagoras escaped, but his Athenian adherents were put to death. Clisthenes now returned to Athens. He seems, however, to have excited popular indignation by promoting a treaty with Persia, by which the supremacy of the Persian king was acknowledged. He thus lent color to the accusation of his enemies that he was aiming at a tyranny; and he was banished. Cleomenes presently invaded Attica a second time, with the Peloponnesian allies. But the other Spartan king, Demaratus, was opposed to his designs. The Corinthians refused to follow him, and his army broke up when it had advanced no further than Eleusis. Meanwhile the Thebans and the Chalcidians of Eubœa had been induced to take up arms against Athens. Freed from the danger of the Peloponnesian invasion, the Athenians marched against the Thebans. They found them on the shore of the Euripus, and routed them. Crossing the strait into Eubœa, they defeated the Chalcidians on the same day. The lands of the Chalcidian knights (Hippobotæ) were divided in equal lots among four thousand Athenians, who occupied them, not as colonists forming a new city, but as non-resident citizens of Athens. This was the first *kleruchia*. The Spartans, incited by Cleomenes, now made a final effort to repress the democratic strength of Athens. Hippias was invited from his retreat on the Hellespont to Lacedæmon, and a Peloponnesian congress was convened at Sparta to discuss a project for restoring him to Athens as tyrant. The representative of Corinth urged that it would be shameful if Sparta, the enemy of tyrannies, should help to set up a new one. The congress was of his mind. The scheme failed, and Hippias went back to Sigeum.

In these five years (510-505) which followed the fall of the Pisistratidae the future of Athens was decided. Athens had become a free commonwealth, in which class grievances no longer hindered the citizens from acting together with vigorous spirit. The results were soon to appear in work done by the Athenians, not for Athens only, but for all Greece.

The time was now drawing near when Greece was to sustain its first historical conflict with the barbarian world. There was not, in the modern sense, an Hellenic nation. But there were common elements of religion, manners, and culture, which together constituted an Hellenic civilization, and were the basis of a common Hellenic character. The first historical event in which the unity of Greece found active expression was the struggle with Persia.

The twelve Ionian cities on the western coast of Asia Minor formed a community which kept itself thoroughly distinct from the Æolian colonists to the north and the Dorians to the south. The Pan-Ionic festivals preserved the memory of the common descent. The Ionian life and culture had a character of their own. But the Ionian cities had no political cohesion, nor had they any recognized leader. One after another they became tributary to the kings of Lydia. The process of subjugation commenced at the time when the Lydian dynasty of the Mermnadæ (about 716 B.C.) began to make themselves independent of Assyria. It was completed by

Crœsus, to whom, about 550 B.C., all the Ionian cities had become subject. Crœsus was friendly to the Greeks; he respected their religion, and enriched its shrines; he welcomed distinguished Greeks to Sardis. All that was exacted from the Ionians by Crœsus was that they should acknowledge him as their suzerain, and pay a fixed tribute. The Persians, under Cyrus, defeated Crœsus and conquered Lydia about 547 B.C. The whole coast-line of Asia Minor was afterward reduced by Harpagus, the general of Cyrus. The Persians, zealous monotheists, destroyed the Greek temples. But it was not till the reign of Darius, who succeeded Cambyses in 521 B.C., that the Ionians felt the whole weight of the Persian yoke. Darius, the able organizer of the Persian empire, preferred that each Ionian city should be ruled by one man whom he could trust. He therefore gave systematic support to tyrannies.

In 502, Aristagoras undertook to restore the exiled oligarchs of Naxos, and for this purpose obtained 200 Persian ships from Artaphernes, the satrap of western Asia Minor. The enterprise miscarried. Aristagoras, dreading the anger of Artaphernes, now began to meditate revolt. He was encouraged by secret messages from Histiaeus, who hoped to escape from Susa by being sent to suppress the rising. Aristagoras laid down his tyranny, and called on the people of Miletus to throw off the Persian yoke. The other Ionian cities followed the example. They deposed their tyrants and declared themselves free. The Æolian and Dorian settlements made common cause with them. Cyprus also joined in the revolt, (500 B.C.) Aristagoras next sought aid beyond the Ægean. Sparta held aloof, but five ships were sent by the Eretrians, and twenty by the Athenians. The united Greek force surprised Sardis, and set fire to it, but was presently driven back to the coast. The Athenians then went home. Darius was deeply incensed by this outrage. The whole Persian force was brought to bear on Ionia, and Miletus was invested by land and sea. In a sea fight off Lade, an island near Miletus, the Ionians were decisively defeated by a Persian fleet of nearly twice their number, partly through the shameful desertion of the Samians and Lesbians during the battle, (496 B.C.) The Persians soon afterward took Miletus by storm, (495 B.C.) The Greek cities of the Asiatic seaboard and of the Thracian Chersonese successively fell before them.

But the vengeance of Darius was not yet complete. He could not forget that Greeks from beyond the sea had helped to burn Sardis, and he resolved that the punishment of Athens and Eretria should be as signal as that of his own vassals in Ionia. A Persian army, under Mardonius, crossed the Hellespont and advanced through Thrace. But the Persian fleet which accompanied it was shattered by a storm in rounding Mount Athos. The progress of Mardonius was also checked by the Thracians, and he retreated to Asia.

In 490 B.C. the second Persian expedition crossed the Ægean under the command of Datis and Artaphernes. Naxos was sacked, Eretria was betrayed. It seemed hardly doubtful that Athens too must fall. The Persians landed in the bay of Marathon, inclosed by the spurs of Brilessus (Pentelicus) and the hills of the Diacria. They thus avoided the dangers of a voyage round a rocky coast; and no part of Attica, Hippias told them, was so favorable to cavalry. The Athenians had sent for help to Sparta; but a religious scruple forbade the Spartans to march before the time of the full moon. Nine thousand Athenian citizens, with the slaves who carried their shields, went forth to meet the Persians at Marathon. On the way they were joined by a thousand Plataeans—the whole force of that city—who came to stand by their old protectors. Miltiades, formerly the ruler of



the Chersonese, was one of the ten Athenian generals. Five of these voted for awaiting Spartan help. The other five, led by Miltiades, were for giving battle at once; and the vote of the polemarch, Callimachus, turned the scale in their favor. The Greeks charged down from the hillside upon the Persians. The Greek center was driven in, but the Greek wings prevailed, and then closed upon the Persian center. The Persians fled to their ships. Six thousand Persians fell. The Greek loss was about 192. Believing that traitors at Athens had signaled to the Persians to surprise the city while undefended, the army hastened back. The Persian fleet soon approached, but seeing troops on the shore, sailed away for Asia.

After the victory of Marathon Miltiades was all-powerful at Athens. He asked the people to give him a fleet, in order that he might strike another blow at Persia while the effects of Marathon were fresh. His demand was granted. But he employed the fleet in an attempt to wreak a private grudge on the island of Paros. At the end of twenty-six days he returned to Athens baffled, and suffering from a wound in the thigh. He was indicted for having deceived the people, and was sentenced to a fine of about £12,000. Being unable to pay it, he was disfranchised as a public debtor. His wound mortified, and he died, leaving debt and dishonor to his son Cimon. Aristides was now the most influential man at Athens, as Themistocles was the ablest. Themistocles foresaw that the Persians would return, and that Athens could resist them only on the sea. He aimed therefore at creating an Athenian navy. Already (491 B.C.) he had persuaded the Athenians to set about fortifying the peninsula of the Piræus, which, with its three harbors commanded by the height of Munychia, offered greater advantages than the open roadstead of Phalerum. He now urged that the revenues from the silver mines of Laurium should be applied to building a fleet. The frequent hostilities between Athens and Ægina enforced the advice. Before 480 B.C. Athens had acquired 200 triremes. Aristides was at the head of a party who viewed this movement with alarm. The strife of parties came to an issue. An ostracism was held, and Aristides was banished—probably in 484 or 483 B.C. Themistocles remained the leader of Athens in the new path which he himself had opened. Athens was now the first maritime power of Greece.

The repulse at Marathon had probably not prevented the Persian commanders from representing their expedition as in a great measure successful. Darius resolved on the complete subjugation of Greece. But, when vast preparations had been in progress for three years, he died, leaving the throne to Xerxes, the eldest of his four sons, by Atossa, the daughter of Cyrus, (485 B.C.) Xerxes was not, like his father, a born ruler or trained warrior. But he was profoundly convinced that all human beings were the natural slaves of the Persian king; and he was influenced by a strong war-party in the palace, with Atossa and Mardonius at its head. The house of Pisistratus, the ambitious Aleuadae of Thessaly, and Demaratus, the exiled king of Sparta, united in urging an invasion of Greece. It was in vain that Artabanus, the uncle of the king, argued on behalf of the moderate party at the court. Orders were given to raise such an armament as the world had never seen—a host which should display the whole resources of the empire from the Indus to the Ægean, from the Danube to the Nile. Forty-six nations were represented by the forces which wintered at Sardis, in 481 B.C. A fleet of 1,200 triremes, and about 3,000 transports and smaller craft, assembled near Cyme and Phocæa, on the Ionian coast. In the spring of 480 B.C. Xerxes led about

a million of men to the Hellespont, whither the fleet went before to meet them.

Greece was probably never stronger than it was at this time. The population of the Peloponnesus may have been about 2,000,000. Athens, according to Herodotus, had 30,000 citizens. The Bœotian towns and the islands were prosperous. The proportion of slaves to freemen varied from perhaps four to one at Athens, to as much as ten to one at Corinth or Ægina. Life was still simple and vigorous. Society was not divided into rich classes encrusted by luxury, and poor classes enfeebled by want. The public palæstras were schools of physical training for war. But that which Greece lacked was political unity. Aristocracy and democracy were already rival forces. Sparta, as the leading city of Greece, took the first step toward the formation of a national party, by convening a congress at the isthmus of Corinth, in the autumn of 481.

The first idea of the national defense was to arrest the torrent of invasion at some northerly point which could be held against great numerical odds. Tempe proving untenable, it was resolved to make a stand at Thermopylæ. When Leonidas had fallen with his 300 Spartans and the 700 Thespians who shared their heroic death, the next object of the Peloponnesian allies was to guard the isthmus of Corinth. The peculiar misfortune of Athens in the war was her position between two gates, the first of which had been forced by the enemy. The Greek leaders seem to have assumed at first that it was vain to oppose the Persian land forces in an open field. Xerxes occupied Athens, and the flames which destroyed its houses and temples at last avenged the burning of Sardis. The Greek ships, which had gained some advantage over the Persian fleet at Artemisium in the northern waters of the Eubœan strait, had moved to Salamis as soon as it was known that the Persians had passed Thermopylæ. The homeless population of Athens had been conveyed to Salamis, Ægina, and Trœzen before the arrival of Xerxes. And now the forecast of Themistocles was verified. Athens, and Greece itself, were saved chiefly by the Athenian ships,—200 in number out of a total of 366. The Peloponnesian leaders wished to withdraw the fleet to the isthmus. Themistocles saw that if it left Salamis it would disperse. He sent word to Xerxes that the Greeks meditated escape. The Persian fleet surrounded them in the night. Next day the battle of Salamis was fought. Of 1,000 Persian ships, 200 were destroyed; the rest fled. It was on the same day that Gelon of Syracuse defeated the Carthaginians at Himera in Sicily, (480 B.C.) Xerxes lost heart and retreated to Asia, leaving Mardonius with 300,000 men to finish the war. In the summer of 479, Athens was again occupied and destroyed by the Persians. Now at length Sparta came to the rescue. Pausanias, the guardian of the young son of Leonidas, led 110,000 of the allies into Bœotia, and utterly defeated the army of Mardonius near Plataea, (479 B.C.) On the same day the troops of the Greek fleet defeated those of the Persian fleet in a battle on the shore at Mycale near Miletus. This victory set Ionia free from Persia.

In the space from the Persian to the Peloponnesian War the central interest belongs to Athens. The growth of Athenian empire, the successive phases through which it passed, and its influence on the rest of Greece, the inner development of Athenian life, political, intellectual, social,—these are the salient features in a period of about fifty years. The first care of Themistocles after the repulse of the Persian invasion was to restore the fortifications of Athens. The jealous interference of Sparta instigated by Ægina and Corinth, was defeated by his ingenuity. A wall of larger circuit



than the old one was built round Athens, and a strong wall was also carried round Piræus.

The league, of which Athens now became the head (477 B.C.), was intended to continue the national defense against Persia. Its special purpose was to guard the Ægean. Aristides was chosen to assess the rate of contribution for the members. The representatives of the several cities met at the temple of Apollo in Delos, where the common fund was also deposited. Hence the league was called the Confederacy of Delos. It was only gradually that this free confederacy, with Athens for a president, passed into an Athenian empire over tributary cities. At first each city contributed ships to the common fleet. But the practice arose of allowing some cities to contribute money instead of ships. A city which did this had no control over Athens, and no protection against attack. One after another of the discontented allies revolted from Athens, and was forcibly reduced to the condition of a subject. Naxos was the earliest example (466 B.C.); Thasos was the next (465 B.C.); and as early as 449 B.C. only three insular allies remained free,—Samos, Lesbos and Chios. The transfer of the common fund from Delos to Athens (about 459 B.C.) was merely the outward sign of a change in which most members of the original league had already been compelled to acquiesce. In the earlier years of the Confederacy the work for which it had been formed was not neglected. Of the successes gained against Persia the most notable was the victory of Cimon over the Persians, both by land and by sea, at the mouth of Eurymedon, (466 B.C.) But, as Athens assumed more and more distinctly an imperial character, the common fund came to be regarded as a tribute which could be applied to exclusively Athenian objects. This was the grievance which made the very name of the "tribute" so hateful.

The years 457-455 B.C. may be taken as marking the greatest extension of the Athenian empire. It was in 457 that their victory at Cænophyta in Bœotia, following on their defeat at Tanagra, enabled the Athenians to break up for a time the oligarchical league over which Thebes presided. Democracies were established in the Bœotian towns, and Athens was virtually supreme, not only in Bœotia, but also in Phocis and Locris. In 455, after a struggle of some years, Athens conquered Ægina. But now the tide began to turn. In 453 the defeat of the Athenians at Coronea destroyed the power of Athens in Bœotia, Phocis, and Locris. Oligarchies were restored. First Eubœa and then Megara revolted from Athens. The Spartans, released from a truce of five years (452-447), invaded Attica. They advanced, however, no further than the Thriasian plain; and it was believed that their leader, the king Pleistoanax, had taken Athenian bribes. Freed from this danger, Pericles was enabled to reduce Eubœa. But the dream of an Athenian land-empire was over. In 445 a truce for thirty years was concluded between Athens and Sparta. Athens gave up all dependencies on the mainland of Greece. Henceforth the Athenian empire was to be maritime only.

Between the conclusion of the Thirty Years' Truce and the events which led to the Peloponnesian War, the most important incidents were—first, the revolt of Samos and its reduction by Athens (440 B.C.); next, the foundation by Athens of two settlements, Thurii, on the site of Sybaris in southern Italy, and Amphipolis, on the Strymon, in Thrace.

The period known as "the age of Pericles" may be roughly defined as the years from 460 to 430 B.C. The idea which pervades the whole work of Pericles is that the Athenian people, having been called upon by circumstances to rule over a wide alliance, must be trained

to rule worthily. Pericles was opposed to extending the empire of Athens; but he was resolved to hold it, because he saw the danger of giving it up. And, in order that it should be held securely, he saw that the people must be educated, first, politically, by constitutional freedom, and next, intellectually and socially, by general cultivation.

The first period of the Peloponnesian war comprises the years from its commencement in 431 B.C. to the peace of Nicias in 421—hence sometimes called the Ten Years' War. As one of its main features was the frequent invasion of Attica by the Peloponnesians, the latter called it the Attic War. The result of it was that Sparta had gained nothing, and that Athens had lost nothing except Amphipolis.

The second period of the war extends from the peace of Nicias in 421 to the catastrophe of the Sicilian expedition in 413. The four years immediately following the peace of Nicias are the only years during which the great fundamental antithesis on which the whole war rested was temporarily obscured. Many of the allies of Sparta were discontented, and the intrigues of Alcibiades were active among them. But it was in vain that oligarchical allies were gained for the moment to the democratic cause. The normal relations were soon restored. Then came the Athenian expedition to Sicily, ending in a crushing disaster.

The third and last period of the war is from the Sicilian defeat in 413 to the taking of Athens by Lysander in 404, a few months after the battle of Ægospotami. This is the period called the Deceleian War, because Decelea in Attica was occupied by the Spartans in 413, and continued to be a permanent base of their operations against Athens. As the sea board of Asia Minor was the scene of much of the fighting, it is sometimes also called the Ionian War.

Sparta itself was changed. The old Spartan institutions had taught a simple reliance on disciplined strength. In the Peloponnesian War Sparta had won the victory with Persian gold. Already the love of money had found its way into the state which had once been so carefully protected from it. Differences of degree had arisen between the citizens, whose equality had been the very basis of the old Spartan life. Citizens who had been impoverished by the rise of prices, and who could no longer pay their share of the public tables, were now distinguished as "inferiors" from those who retained their full civic rights. Spartan commanders abroad were not always inaccessible to bribes. The habit of military discipline indeed remained. Spartans were still distinguished, as a rule, by gallantry in the field, by care for the dead and by attention to the ritual of the gods. The old type of Spartan leader—the rough soldier incapable of eloquence or of finesse—had ceased to be the only type.

Sparta had waged the Peloponnesian War in the name of freedom. The Greek cities were to be liberated from the all-absorbing tyranny of Athens. Now, however, Sparta altogether failed to redeem these pledges. On the contrary she aimed at setting up a tyranny of her own. Oligarchical governments were established, controlled in each city by a Spartan garrison under a Spartan harmost or military governor. The earliest and one of the worst cases was the tyranny of the thirty tyrants at Athens, set up by Lysander, and supported by Spartan arms until, after eight months, the Athenian exiles under Thrasybulus marched from Phyle upon Athens. The Athenian democracy was formally restored in September, 403 B.C.; and the liberators used their victory with a wise moderation. Four years later Socrates was put to death, because a party blindly zealous for the old beliefs of



Athens could not see that such thought as his led to the only firm basis for a new social order.

The retreat of the 10,000 Greeks under Xenophon, in 401 B.C., marks a turning-point in the relations of Greece to Persia. It was to the Greeks a striking revelation of Persian weakness, an encouragement to schemes of invasion which would before have seemed wild. Sparta now began a war against the Persians in Asia Minor—partly to escape from the reproach of having abandoned Asiatic Hellas to the barbarian. Agesilaus, on whom the lesson of the famous retreat had not been lost, was encouraged by success to plan a bolder campaign. But in 394 B.C. the Athenian Conon, commanding the fleet raised by the satrap Pharnabazus, utterly defeated the Spartan fleet at Cnidus. Soon afterward, under his protection, the Long Walls of Athens were restored. The Spartan power in Asia Minor was at an end. The oligarchies were overthrown, and the Spartan governors expelled.

The reverses of Sparta did not end here. At the instigation of Persia an alliance was formed between Athens, Thebes, Argos, and Corinth. In the territory of the latter state the allies waged war on Sparta, to whose aid Agesilaus was recalled from Asia. When the Corinthian War had lasted six years, the peace of Antalcidas was negotiated between Sparta and Persia, (387 B.C.) By it the Greek cities in Asia, with Cyprus, were given up to Persia. Lemnos, Imbros, and Scyros were assigned to Athens. All other Greek cities were declared independent. The meaning of this was that they were to be independent of each other—isolated for purposes of defense—and all alike dependent on the Great King. The Corinthian War had begun from Persian intrigue; it ended with a peace dictated by Persia.

A few years later these designs met with their first serious check. In 382 B.C. the Spartans treacherously seized the Cadmea or citadel of Thebes. They held Thebes for three years. But in 379 a party of Theban exiles, under Pelopidas, surprised the Spartan garrison and recovered the city. A still greater discouragement to Sparta was the establishment of a new Athenian Confederacy—precautions being taken against the members passing, as under the Delian Confederacy, into the condition of mere tributaries. Thebes joined the new confederacy, and presently succeeded in restoring the old Boeotian league, of which Thebes was the head. But the rise of Thebes had excited Athenian jealousy. Peace was made in 371 between Athens and Sparta. Thebes, thus isolated, was at once attacked by the Lacedæmonians. They invaded Boeotia, but were defeated by the Thebans under Epaminondas at Leuctra, 371 B.C. This destroyed Spartan power outside of the Peloponnesus. Epaminondas next invaded the Peloponnesus itself. The Arcadian league did not long hold together. Mantinea led a group of Arcadian towns favorable to Sparta. In 362 B.C. a battle was fought near Mantinea between the Spartans and the Thebans. The Thebans were victorious, but Epaminondas fell. With his death the temporary supremacy of Thebes came to an end. Sparta had, however, been reduced from the rank of a leading state.

Political confusion is indeed the general characteristic of the period between the end of the Peloponnesian War and the Macedonian conquest of Greece. In the preceding century Athens and Sparta had been the vigorous representatives of two distinct principles. The oligarchic cities rallied round Sparta, the democratic round Athens. But at the end of the Peloponnesian War Athens was exhausted. Sparta, now predominant, but suffering from inner decay, exercised her power in such a manner as to estrange her natural

allies. Thus both the normal groups of states were broken up. New and arbitrary combinations succeeded, seldom lasting long, since they were prompted merely by the interest or impulse of the hour.

Three years after the death of Epaminondas Philip came to the throne of Macedon. His power rapidly grew. A warlike people, ruled by an able and ambitious king, was now the northern neighbor of Greece. The most obvious vice of Greek politics at this period was disunion; but the disunion itself was only the symptom of a deeper decay. No one city of Greece any longer retained the vigor required in a leader. Had either Athens or Sparta now possessed such vital force as they showed in the Persian wars, no local or temporary feuds would have prevented the organization of national defense. Nothing marks the decay of the Greek commonwealths more significantly than the fact that they did not even recognize the urgency of the danger. Demosthenes had the old Greek spirit; but he stood almost alone. The principles on which he constantly insisted, and which gave unity to his entire career, are mainly two—first, the duty of Athenian citizens to sacrifice personal ease and gain to the service of Athens; secondly, the duty of Athens, as the natural head of free Greece, to consult the interests of all the Greek cities. The energy of Demosthenes was not first roused by the progress of Philip. Before there was danger from the quarter of Macedon, Demosthenes had seen clearly that the decay of public spirit threatened the destruction of Hellenic life. As he said to the Athenians afterward, if Philip had not existed they would have made another Philip for themselves. And the condition of Athens was at least not worse than that of any other city which could have aspired to lead.

A strategist so keen-sighted as Philip must early have perceived that he had little to fear from combined resistance, so long as he was careful not to attack too many separate interests at the same time. Greeks, he saw, were past fighting for each other as Greeks. This was the key-note of his policy to the last. While making aggressions on one Greek city or group of cities, he always contrived to have others on his side.

Philip's career in relation to Greece has two periods. The end of the first period is marked by his admission to the Amphictyonic Council; the end of the second, by the battle of Chæronea. During the first period, Philip is still a foreign power threatening Greece from outside. He takes Amphipolis from the Athenians; he destroys Potidæa; he acquires towns on the Thracian and Messalian coasts; he defeats the Phocians under Onomarchus, and even advances to Thermopylæ, to find the pass guarded by the Athenians; finally, he destroys Olynthus and the thirty-two towns of its confederacy. In the second period he is no longer a foreign power. Having intervened in the Sacred War and crushed the Phocians, he has taken the place of Phocis in the Amphictyonic Council, and has thereby been admitted within the circle of the Greek states. The First Philippic, and the three Olynthiac speeches of Demosthenes, belong to the first of these periods. The speeches On the Peace, On the Embassy, On the Chersonese, and the two later Philippics, belong to the second. In the Third Philippic, the climax of his efforts before Chæronea, Demosthenes reviews the progress of Philip from the Hellenic, not merely from the Athenian, point of view. Philip has destroyed Olynthus; he has ruined Phocis; he has sown dissensions in Thessaly; Thebes is afraid of him; he has gained Eubœa and the Peloponnesus; he is supreme from the Adriatic to the Hellespont; and the last hope of Greece is in Athens. Demosthenes succeeded in winning back Byzantium to the Athenian alliance, and in persuading Thebans to



fight by the side of Athenians; but he could not avert the catastrophe of Chæronea.

After the victory which made him master of Greece, Philip deprived Sparta of her conquests in the Peloponnesus. The Messenians, Arcadians, Argives, recovered their old possessions. A congress was then summoned at the isthmus of Corinth. Macedonia and the Greek states were united in a federal league. A federal council was constituted to guard the federal laws; and the Delphic Amyphictyony was recognized as a tribunal to which this council should refer any breach of those laws. Philip, representing Macedonia, the most important member of the league, was acknowledged as its head or president. His position in regard to the Greek cities was thus in form much the same as that of Athens or Sparta in former days.

If Greek liberty had received a fatal blow in Greece proper, there was another part of Hellas in which, almost simultaneously, it had been vindicated with splendid success. While Demosthenes was making his heroic resistance to the designs of Macedon, the enemies of Hellenic freedom in Sicily had been encountered with equal vigor and happier fortune by Timoleon. A few years after the defeat of the Athenian armament in 413, Sicily had suffered two invasions of the Carthaginians. Selinus and Himera, Agrigentum, Gela, and Camarina, had successively fallen. The first Dionysius, in consolidating his own tyranny at Syracuse, had been content to leave half the island in the hands of the foreign foe. The feeble misrule of his son, Dionysius II., produced a series of revolutions. A party at Syracuse invoked the aid of Corinth. Timoleon was sent with only 1,200 men, (343 B.C.) His first work was to deliver Syracuse from the contending forces of Dionysius and a rival named Hicetas, and to restore the Syracusan democracy. His next work was to drive the Carthaginians out of Sicily. He defeated them with crushing effect at the river Crimesus, (340 B.C.) The Sicilian Greeks were now free. Sicily entered on a new period of prosperity, which lasted until Agathocles became tyrant of Syracuse, (317 B.C.) Thus the brightest days, perhaps, of Hellenic Sicily coincided with those in which the cities of the Hellenic mainland were learning to bear the Macedonian yoke.

The time seemed now to have come for an enterprise which, since the retreat of the Ten Thousand, had been the dream of many Greek captains, but which none had yet been in a position to attempt. Philip, in the forty-seventh year of his age, had declared war against Persia, and was preparing to invade Asia at the head of an army gathered from all Greece, when he was assassinated by a young Macedonian noble in revenge for a private affront, (336 B.C.) Alexander, Philip's son and successor, was only twenty. Marching into Greece, he promptly repressed an insurrectionary movement, and was recognized by a new assembly at Corinth as commander-in-chief of the Greek armies. He next marched against the tribes on the northern borders of Macedonia. While he was absent on this expedition, the Thebans rose against the Macedonian garrison. Alexander returned, took Thebes, and razed it to the ground, (335 B.C.) At Corinth he received the homage of the Greek states, and then returned to Macedonia.

Alexander was now free to execute the designs of Philip. As captain-general of Hellas, he set forth to invade the Persian empire, and to avenge the wrongs suffered by Greece at the hands of the first Darius and of Xerxes. The army with which he crossed the Hellespont in 334 B.C., numbered perhaps about 30,000 infantry and 4,000 cavalry. It was composed of Macedonians, Greeks, and auxiliaries from the barbarian tribes on the Macedonian borders.

Alexander's career of conquest has three stages, marked by his three great battles. The victory at the Granicus (334 B.C.) gave him Asia Minor. The victory at Issus (333 B.C.) opened his path into Syria and Egypt. The victory at Arbela (331 B.C.) made him temporary master of the whole East. Asia Minor was by degrees thoroughly Hellenized, and remained Greek till the Turks came in the eleventh century. Syria and Egypt were not indeed Hellenized as whole countries, but their capital cities, Antioch and Alexandria, were Hellenic; and the control established by Alexander was retained by Macedonia or by Rome for centuries. At the third stage, however, Alexander's conquests entered upon an entirely new phase, and compelled him to take up an altogether new position. Neither in his Hellenic nor in his Macedonian capacity could he put forward any effective claim to hold the Persian empire proper,—the empire stripped of its Egyptian, Phœnician, and Hellenic dependencies. He could hold Persia only as a Persian king, as the successor of those Achæmenid kings whose dynasty he had overthrown. The constitutional king of Macedonia, with limited prerogatives, the elective captain of Greece, must now assume a third and distinct character. He must be also a Persian king, an irresponsible despot.

The colonies planted by Alexander in his progress through Asia make the beginning of a new period in Hellenic history.

The results of Alexander's conquests were beneficent chiefly in two ways: first, by liberating the hoarded treasures of the Eastern kings, and so stimulating industry and commerce; secondly, by opening Asia to a new civilization, which helped to promote intellectual and moral progress, even in those places where its influence was limited or transient. In the process of doing this much that was valuable may have been destroyed. But it can hardly be questioned that on the whole the gain far outweighed the loss. If Alexander had not died at the age of thirty-two, leaving his work unfinished, it would perhaps have been easier to judge how far he deserves the credit of having contemplated these benefits to mankind.

The later history of the Greeks, from the end of Alexander the Great's reign to the taking of Constantinople by the Turks, may be divided most naturally into five periods, viz.—I. The period of Greek subjection; from the death of Alexander to the accession of Constantine the Great as sole emperor, 323 B.C. to 323 A.D. II. The period of Greek revival; from Constantine the Great to Leo III. (the Isaurian), 323–716 A.D. III. The period of Byzantine prosperity; from Leo III. to Isaac I. (Comnenus), 716–1057 A.D. IV. The period of Byzantine decline; from Isaac I. to the taking of Constantinople by the Latins, 1057–1204 A.D. V. The period of Greek survival; from the taking of Constantinople by the Latins to its conquest by the Turks, 1204–1453 A.D.

The history which we thus enter upon is of importance and interest in a different way from that of the classical age of Greece. That age was a unique development in respect of national life and character, of social and political institutions, and of every form of cultivation, and was marked by concentrated energy and intense vigor. The later period is important because of its wide-reaching influence on the world at large, and because it is one, and that the more continuous, of the two great chains of events, in eastern and western Europe respectively, which connect the earlier and later history of civilized man.

The first of these concerns the character of the Greeks during the time of their subjection to the Romans, and in particular under the early emperors, in which age



they are often supposed to have been a demoralized and unprincipled race. The later Greeks no doubt had degenerated from their great forefathers; but it is only fair to remember that this was to a great extent the result of their circumstances. The rapid growth of Greek culture and Greek political ideas was naturally followed by rapid decay. In sculpture the early archaic style developed in a few decades of years into the manly and perfect style of Phidias, and the change was equally rapid to the luxurious style of Praxiteles, in which the elements of decadence were already traceable. The same thing is apparent in the history of the drama.

The other misconception relates to the Byzantine empire, which has been commonly regarded as a period of steady decline and feebleness and decrepitude. The author who is mainly responsible for the prevalence of this view is Gibbon; and it is strange that a writer who was gifted with such profound historical insight should not have perceived that the state which accomplished such great things could not have been powerless. The passage in which he expresses himself on this subject is well known. "I should have abandoned without regret," he says, "the Greek slaves and their servile historians, had I not reflected that the fate of the Byzantine monarchy is passively connected with the most splendid and important revolutions which have changed the state of the world." Yet it was this same empire which beat back for centuries, and ultimately survived, first the Saracens and afterward the Seljuks, both of which peoples would otherwise have overrun Europe, and which, even in its decline, kept at bay for more than a hundred years the Ottomans when at the height of their power, thereby providing the Western nations with a breathing space, without which the career of Turkish conquest would certainly not have been arrested at Vienna, but might have extended to the Elbe or the Seine. During the eighth, ninth and tenth centuries its military power was the strongest in Europe, and the individual prowess of its aristocracy was unrivaled, while at the same time its long succession of able emperors and administrators is such as no other monarchical government can show. Its influence is further shown by its missionary effort, resulting in the conversion to Christianity of the south Slavonic nations and the Russians, and the consequent spread of civilization throughout the countries they inhabited; by its widely extended commerce both by land and sea; and by its art, especially its architecture, which contributed to the formation of other styles from Egypt to the north of Russia, and from India to Spain.

The conquests of Alexander the Great differed from those of almost every other great conqueror in this—that they were followed up by a scheme of civil government, the object of which was to secure the well-being and promote the civilization of all his subjects. That he was not the ambitious madman which he is often represented as being, is amply proved by the forethought with which his campaigns were planned, and by his attention to the commissariat and to other details connected with the transport and maintenance of his vast armies. But his true greatness is most clearly shown by his endeavoring to introduce unity into his vast empire, not by subjecting one race to another, or crushing out the hope of further resistance by an iron rule, but by establishing in it centers of permanent institutions and common culture. These were the Greek colonies with municipal government which he founded at intervals throughout Asia. By these the subject countries, without being forced into a common mold, or organized in defiance of their feelings and prejudices and without reference to their national institutions, were gradually leavened by the system that existed among them, and obtained a certain infusion of the Hellenic character and Hellenic modes

of thought. Though Alexander himself did not survive to complete his project, yet enough had been accomplished at the time of his death to leave its influence firmly imprinted, even when his empire fell to pieces and was partitioned among his generals. The consequences of this to Asia were of incalculable importance, and continued unimpaired until the tide of Mahometan conquest swept over the country; and even then it was from Greek literature and art that the Arabs obtained the culture for which they have been celebrated. The Hellenic world was henceforth divided into two sections—the Greeks of Greece proper, and the Macedonian Greeks of Asia and Egypt. The non-Greek inhabitants of the countries in which the Greeks were settled were described as "Hellenizing," and consequently their language, such as we find it in the Septuagint and the New Testament, was called Hellenistic Greek. The literary spirit also migrated to Alexandria, which became for a time the home of the principal Greek culture, and nurtured the genius of Theocritus, the first of pastoral poets, the taste and erudition of Aratus and Apollonius Rhodius, and the research of Aristarchus and other eminent Homeric critics.

The period of somewhat less than two centuries (323–146 B.C.) which intervened between the death of Alexander and the conquest of Greece by the Romans was a sort of twilight between liberty and subjection.

At length the constant danger to which their liberties were exposed suggested the necessity of some kind of combination on the part of the separate states, and the famous Achæan league arose (280 B.C.), which revived the dying energies of the Greeks, and has thrown a luster over their period of decline.

From the time of the Roman conquest the existence of Greece was merged in that of greater political unity, so that for the next four centuries, until the commencement of the barbarian inroads, it can hardly be said to have a history of its own.

It was a part of the Roman policy, in dealing with conquered countries, to treat them at first with mildness, until they became inured to the yoke, and when this was the case, and precautionary measures had been adopted to prevent the possibility of successful revolt, to deal with them more harshly and increase their burdens. This was what happened in the case of Greece. The government never paid attention to the provinces for their own sake, but regarded them as an instrument for maintaining the greatness and power of Rome. The immense sums that were drained from them never returned, but were expended in the maintenance of the Roman army, and in the public games and architectural embellishment of the metropolis. Objects of local usefulness, such as roads, ports and aqueducts, received no attention from the central authorities, and no money was supplied toward their maintenance. Within a century also, when these evils were beginning to make themselves felt, the Roman rule became very oppressive.

The period, however, during which the greatest injury was inflicted on Greece was that of the Mithradatic War, (86 B.C.) At the commencement of that struggle many of the leading men and states declared in favor of Mithradates, thinking that under his auspices they might regain their freedom. But the appearance of Sulla with an army soon undeceived them, and they laid down their arms, with the exception of Athens, which was only reduced after an obstinate defense. When the city was at last taken by storm, the majority of the citizens were put to the sword, their possessions seized by the soldiers, the Piræus utterly destroyed, and Attica ravaged. In the same campaign Delphi and the other principal shrines were plundered, and an immense amount of property was ruined throughout the country.



Great injury was also inflicted by the Cilician pirates. The confined seas and numerous bays and islands of Greece have always been favorable to piracy, and at this time the evil reached such a height that the welfare of the state was threatened, and Pompey was intrusted with the office of eradicating it; but before this was accomplished many of the wealthiest cities in Greece and Asia Minor had been attacked and pillaged. With the accession of Augustus a brighter era seemed to have dawned; and under the early emperors, who desired to strengthen themselves against the senate, the interests of the provincials were more considered. Greater regularity also was introduced into the taxation, by the land and capitation taxes being regulated by a periodical census. But the old evils to a great extent remained, and these were further aggravated at a later time by the depreciation of the coinage, which proceeded with fearful rapidity, and caused widespread distress among the commercial and laboring classes.

The result of these changes is traceable in the condition and character of the Greek people. The conquests of Alexander the Great suddenly threw into circulation the accumulated treasures of the Persian empire, and a great part of these passed into the hands of the Greeks, both in Asia and Europe. The facilities thus created for obtaining wealth increased the material prosperity of the Greek race at large, so that in all probability it never was more numerous than during the period immediately preceding its subjugation by the Romans. Though all calculations respecting the numbers of the population in ancient states are necessarily hazardous, yet it seems probable that the Greeks at that time may have amounted to more than seven millions. But with Greece proper the case was different. There the increase of wealth raised the standard of living considerably above what it had been in earlier and more frugal times, so that the less moneyed class were tempted to emigrate in large numbers to seek their fortunes in the great Asiatic cities, and in the service of the Eastern monarchs, where so great openings presented themselves. The decrease of this class produced a larger accumulation of property in the hands of large owners, and greatly augmented the number of slaves. The depopulation of Greece continued; but while in this way the power of the nation was being weakened, and its material resources diminished by the loss of much of the capital that had been invested in the improvement of the country, the actual condition of the inhabitants was for the time improved, because the decrease in their numbers had been more rapid than the destruction of property. Possessing the necessities of life in abundance, and having but little money to spend on anything beyond, they sank into that condition of indifference and ease in which at last the barbarian nations found them.

The love of art still prevailed among them, and the quiet, studious life of the Greek cities formed, in the eyes of many, a favorable contrast to the violent struggles and inordinate passions of Rome. But the disbelief in the national religion which had grown up among the educated classes, notwithstanding the maintenance of the temples and their worship, tended to cause a separation between the upper and lower grades of society, and this, together with the isolation produced by the great size of the estates, which withdrew individuals from the scrutiny of their fellow citizens, weakened the force of public opinion, and thus lowered the moral standard. Thus, during a period of six centuries, the European Greeks had gradually degenerated, though, for the most part, from causes external to themselves; they seemed to have become an insignificant and almost commonplace people. It remained to be shown that

the finer qualities and more vigorous elements were only dormant, and this was brought to light in the latter half of the third century by two influences, which we must now proceed to explain.

The first of these was the invasions of the Goths. These were the earliest of the barbarians to break through the Roman frontier, and the defeat and death of the emperor Decius in Mœsia (251 A.D.), and the subsequent incursions of the Goths into Thrace and Macedonia, warned the Greeks of the peril that impended over them. Immediately the walls of Athens were repaired, the fortifications across the isthmus of Corinth restored, and vigorous preparations made for defense. The invaders soon made their appearance, both by land and sea, and one division, landing at the Piræus, succeeded in carrying Athens by storm; but an Athenian of rank, called Dexippus, afterward the historian of these events, succeeded in assembling a sufficient force to compel them to retire. This reverse was the prelude to their total overthrow, for succors were meanwhile arriving from Italy, by which their separate bands were attacked in detail and destroyed. Some years later, after other inroads, during which many cities of Greece successfully defended themselves, the power of the Goths was broken by the emperor Claudius II. at the great battle of Naissus, (269 A.D.)

The other and far more important influence which regenerated the Greeks at this time was Christianity. This religion, which had long been working in secret, though in ways which it is almost impossible to trace, now began to produce a marked impression on Greek society. Its power was the greater because it had worked from below upward, and had permeated to a great extent the lower and middle classes. It improved the moral condition of the Greeks by elevating their views of life, by quickening the conscience, and by infusing earnestness into the character; and it renovated their social condition by pointing out to them their duties to one another, by encouraging corporate feeling, and in particular by purifying the domestic relations through its influence on the female sex.

The scene now changes, and from the land of Hellas our attention is transferred to the city of Constantinople.

The principal events of the first half of this period, the two centuries which intervened between Constantine and Justinian, are—the foundation of Constantinople (330 A.D.); the emperor Julian's attempted restoration of Paganism (361); the defeat of Valens by the Goths near Adrianople, and his death (378); the establishment of Christianity by Theodosius the Great as the religion of the empire (388); the partition of the Roman empire between Arcadius and Honorius (395); the publication of the Theodosian code (438); and the extinction of the empire of the West (476). The reign of Justinian (527–565) comprises the great campaigns of Belisarius and Narses, whereby the kingdom of the Vandals in Africa was overthrown, and Sicily, Italy, and southern Spain were recovered to the Roman empire, the Greek possessions in Italy being henceforth governed by an exarch, who resided at Ravenna; the building of the church of St. Sophia at Constantinople; and the reformation of the Roman law. Finally, in the century and a half between Justinian's death and the accession of Leo III., occurred the birth of Mahomet (571); the victorious expeditions of Heraclius against the Persians (622–8); and the seven-years' siege of Constantinople by the Saracens in the reign of Constantine Pogonatus (668–675).

The reforms effected by Constantine formed one of the greatest revolutions the world has ever seen, and his sagacity is shown by the completeness with which



they were carried out, and by the permanence of their effects, for from them proceeded both the strength and the injuriousness of the Byzantine system, which lasted even to the latest days of the empire. To describe them in brief,—he centralized the executive power in the empire, and constituted a beaurocracy for the administration of public business; he consolidated the dispensation of justice throughout his dominions; he rendered the military power, which had hitherto been the terror and bane of the state, subservient to the civil power; he adopted a new religion, and established a new capital. Henceforth the world was ruled by the emperor and his household, and this administration was wholly irresponsible; and as the interests of the government were unconnected with those of any nationality and any class of its subjects, there was sure to be a continual struggle between the rulers and those whom they governed.

We must not overlook the strong points of Constantine's system. The first of these was the regular administration of justice which he introduced. This the inhabitants of the empire felt they could not obtain elsewhere, and the possession of it reconciled them to many otherwise intolerable grievances. So conscious were succeeding emperors of this that we find strictness observed in this matter until quite a late age of the Byzantine empire. Another was the amount of ability and experience which it secured for the public service. Each department of the state formed a profession of itself, as completely subdivided, and requiring as special an education as the legal profession at the present day. The perfection of this machinery accounts for the empire not having fallen to pieces in times of internal dissension, sometimes accompanied by foreign invasion; and the facilities afforded for developing talent are seen in the long succession of able administrators which the system produced, and which came to an end at the commencement of the eleventh century, when it began to be disused.

The choice of the site of New Rome—which is perhaps the finest position in the world, as it commands the meeting point of two great seas and two continents, and rises in seven hills on its triangular promontory between the Propontis and its land-locked harbor the Golden Horn—is an additional proof of the penetration of Constantine; and the event justified his selection, for on numerous occasions nothing else than the impregnability of the seat of government could have saved the empire from destruction. Though the establishment of a new capital was in itself a consummate stroke of genius, yet to some extent it was forced upon the emperor by his conversion to Christianity, for this placed him in direct antagonism to Old Rome, which was still the headquarters of paganism. The new city at the time of its foundation was Roman: its senators were transported thither from Rome; the language of the court was Latin; and the condition of the lower classes was assimilated to that of the old capital by their being exempted from taxation and supported by distributions of grain. But from the first it was destined to become Greek; for the Greeks, who now began to call themselves Romans, an appellation which they have ever since retained, held fast to their language, manners, and prejudices, while they availed themselves to the full of their rights as Roman citizens. Hence, in Justinian's time, we find all the highest offices in the hands of Greeks—not Hellenic Greeks, but a Græco-Roman caste, the descendants of the Macedonian conquerors of Asia; and Greek was the prevailing language. The turning-point in this respect was the separation of the East and West in the time of Arcadius and Honorius.

Whether the conversion of Constantine to Christianity was due to sincere belief or to policy, or, as is perhaps most likely, to a combination of the two motives, there can be no doubt that religion had before that time obtained a great influence over the Greeks, and that the cause of the Christian Church and that of the Greek nation were already closely interwoven. Nothing could show more clearly the mastery obtained by the new faith than the subsequent failure of the Emperor Julian to revive paganism. But the orthodoxy of the Eastern Church, which came to be, and still is, its most distinctive feature, and the identification of the Orthodox Church with the Greek nation, date from a different time, viz., from the reigns of the Arian successors of Constantine, to whose personal opinions the people were strongly opposed. The political effect of this union ultimately became very great, and resulted in the loss of important provinces to the empire.

The reign of Justinian, which, from the important events which it contained, has naturally much attracted the notice of historians, was a period of false brilliancy. The character of that emperor in many respects resembles that of Louis XIV. Both were men of moderate ability, gifted with great industry and application to business, and with a remarkable power of employing the talents of others; both were fond of splendor and foreign conquest; and both impoverished and ruined their subjects. No doubt the conquests of his generals were splendid, and testify to the greatness of the armies of the empire at this time. No doubt also the compilation of the *Pandects*, *Code*, and *Institutes* was a magnificent work, which has left indelible traces on the legal systems of Europe. And it is an honor to any age to have developed the Byzantine style of architecture, a style thoroughly Greek in its unity and proportion. But the effects of his reign on his dominions were ruinous. He riveted tighter the fetters which Constantine had invented, but he lacked the penetration of Constantine in perceiving the needs of his time. He dissolved the provincial militia, which to some extent still existed in Greece. The population were ground down by taxation, the revenues of the free cities in Greece were seized, and at last the fortifications fell into disrepair, and a great part of the army was disbanded, so that when Zabergan, king of the Kutigur Huns, invaded the country from the north in the year 559, he was able to approach within seventeen miles of Constantinople.

The 400 years which elapsed between Constantine and Leo III. were the great period of the barbarian invasions. The Goths, who, as we have seen, had overrun Greece in the latter half of the third century after their great defeat at Naissus (Nisch), were more or less kept in check, and became in some degree a civilized and Christian people in the country of Dacia, to the north of the Danube, which they had permanently occupied after the Roman colonies in that country were withdrawn by Aurelian. But in the reign of Valens, when the Huns were overrunning Europe, they were pressed onward by these invaders, and occupied Moesia between the Danube and the Balkan, which province was peacefully ceded to them. It was only in consequence of treacherous treatment by the Romans that they afterward entered the empire as enemies, and fought the campaign which ended in the defeat and death of that emperor (378). They were again checked by Theodosius, and persuaded to enlist in great numbers in the imperial service; but during the reign of his successor Arcadius, the famous Alaric roused the spirit of his countrymen, and ravaged the whole of Greece even to the Peloponnesus (395), before he turned his thought to the invasion of Italy. For a time both Goths and Romans were the victims of



Attila, who with his hordes of Huns swept over the lands south of the Danube (442-7), and was only induced to retire by an agreement on the part of Theodosius II. to pay him an annual tribute. But again, in the reign of Zeno (475), the empire was in imminent danger from the Goths under Theodoric, who, like Alaric, had lived at Constantinople, and like him also withdrew into Italy. Toward the beginning of the sixth century the Goths made way for more barbarous invaders, Bulgarians of Turanian origin, and various Slavonic tribes, for whose pastoral habits the now depopulated country was better suited than for a more civilized population. But they in turn were soon swallowed up by the Avars, whose vast monarchy occupied a great part of eastern Europe, and whose armies, in the time of Heraclius, threatened Constantinople itself. The Avar power disappeared as suddenly as it had risen, and at the end of the seventh century its place is taken by the Bulgarian kingdom, which lasted for nearly 350 years, and was the great antagonist of the Byzantine empire in its most flourishing period.

On the side of Asia, during the same period, a long struggle was maintained with Persia. The dynasty of the Sassanides, which arose on the ruins of the old Parthian kingdom, had raised that country to great power and prosperity. The second in order of its princes, Sapor I., had taken the emperor Valerian prisoner (257), and a century later Julian lost his life when fighting in Persia. The ill success of Justinian in his Persian wars ought fairly to be ascribed as much to the ability of his great opponent, Chosroes Nushirvan, as to his own shortcomings; but the fact remains that even Belisarius won small glory from those contests, and after a struggle of twenty years' duration, a treaty was concluded, which required the European monarch to pay an annual subsidy of thirty thousand pieces of gold. War, however, continued during the reigns of his successors, Justin II. and Tiberius II., until an honorable peace was concluded by Maurice, the son-in-law of the last-named emperor, at whose court Chosroes II., the rightful sovereign, had been received when he was an exile. But when Maurice was dethroned by the rebel Phocas, the Persian monarch declared war, professedly with the design of avenging his benefactor. The greater part of the Asiatic provinces were laid waste, and a Persian army was for a time encamped on the shores of the Bosphorus, so that it seemed as if the Roman empire was about to be conquered by Persia. From this it was saved by Heraclius, who was not only one of the ablest of the emperors, but one of the greatest of military leaders. He waded off the impending danger, and in seven campaigns by a series of brilliant victories, dealt a death blow to the Persian power.

We turn now to the condition of the Greeks during this period. In the interval between the first Gothic invasions and the accession of Constantine the material prosperity of Greece had increased, owing partly to the devastation of the provinces to the north of that country, the wealthy inhabitants of which were forced to take refuge in Greece, and partly to the insecurity of the Red Sea, Egypt and Syria, which caused the commerce of Central Asia to take the route of the Black Sea, whence the trade of the Mediterranean passed once more into the hands of the Greeks. The period of 120 years between the death of Arcadius and that emperor's accession was a time of improvement. During the long reign of Theodosius II. the power was in the hands of his sister, the philanthropic Pulcheria, and of his ministers, and these seem to have ruled judiciously; and the five succeeding emperors, Marcian, Leo. I., Zeno the Isaurian, Anastasius and Justin, were all men born in the middle or lower class of society, and of provincial origin, and had come to the throne at a

mature age. The sympathy which they thus had with the body of their subjects accounts for their economy, and for their endeavors to restore the resources of the empire and alleviate its burdens, and generally to introduce regular forms of procedure into public business. Far different was the case with Justinian, whose severe demands for money distressed all classes of his subjects. But it was on Athens that his hand was most heavily laid. That city was still a literary capital where Hellenic learning was cultivated; and if the *Hero and Leander* of Musæus and that graceful pastoral romance, *Daphnis and Chloe* of Longus, are to be assigned to so late a date as the fifth century, the spirit of the ancient literature had not long been extinct among the Greeks. The ancient buildings still existed in their splendor; the citizens lived a life of quiet, self-complacent ease; and the paganism, of which it was now the center, had been purified from its vices by the maxims of philosophy and the influence of Christianity. It remained for Justinian, in his merciless centralization, to close its schools and confiscate their revenues. At the same time the Olympian games were brought to an end. From this time onward the inhabitants of Hellas are but little heard of, and at the beginning of the eighth century we find them spoken of by Byzantine writers under the contemptuous title of Helladici, while the Greek nation is represented by the population of Constantinople and Asia Minor.

One result of the financial legislation of this time was a change which, though the lawgivers certainly did not foresee it, was most beneficial in its effects. This was the gradual extinction of slavery in the Eastern empire. The power that effected this was not Christianity, for that religion had recognized slavery as an institution, nor yet civilization, for that among the Greeks was intimately connected with the employment of slaves. It was rather produced by an alteration that was taking place in the condition of certain classes, which annihilated the distinction between the freeman and the slave. Many centuries elapsed before this change fully worked itself out. The slave trade was still an important branch of commerce in the Roman empire, and freemen were sold as slaves if they failed to pay their taxes; but henceforth the system was doomed to ultimate extinction.

It is important also to remark, now that we are approaching the period of change from ancient to modern society, that the decline of civilization in the later Roman empire was not owing to degeneration in the people themselves, or to an inevitable downward tendency in highly civilized communities. The forbidding to carry arms necessarily renders a people unwarlike. Where municipal institutions are discouraged, public opinion soon becomes powerless. When the resources which might be employed in constructing roads are withdrawn, communication ceases, and with it the interchange of ideas and other influences by which the intellect is quickened. The degradation was produced by the injustice of the Government, which pillaged its subjects, and systematically destroyed all independence among them. Whenever the iron hand was removed, they showed signs of renewed life and vigor, but the strength of the central power was too great to encourage any hope of resisting it successfully. They had no choice but to sit down under it, and suffer it to drain their life-blood by slow degrees.

At the commencement of the eighth century the extinction of the empire of the East appeared to be imminent. The same causes which had overthrown the Western empire were threatening it with destruction. The Saracens had overrun all its Asiatic possessions, and had attacked the capital itself, while in Europe it



was threatened by the Bulgarians. The provinces were falling off: Syria, Egypt, Africa, and the conquered provinces of Spain were wholly lost, and in Italy the dominions of the exarchate were greatly circumscribed by the Lombards. At home rebellion prevailed in the army, and anarchy in the government, six emperors having been dethroned within the space of twenty-one years. It seemed as if the Greek race itself would be destroyed; in the countries conquered by the Saracens the Greeks were almost exterminated, and Greek civilization proscribed, while Hellas was threatened with occupation by the barbarians. But at this moment the helm of the state was seized by a man who, by his force of character and his great abilities, inaugurated a new state of things, and gave the empire a new lease of life. This man was Leo the Isaurian.

Considerable difference of opinion has existed as to the precise time at which the Roman empire of the East may be said to have ended, and the Byzantine empire to have commenced. Gibbon remarks that "Tiberius by the Arabs, and Maurice by the Italians, are distinguished as the first of the Greek Cæsars, as the founders of a new dynasty and empire."

We must first notice the reforms which caused the reign of Leo III. to be an era in the history of the empire. These extended to almost every branch of the administration. In respect of the army, he reorganized the military establishment by placing the various bodies of soldiers in the different "themes," or departments, each with a general of its own, thereby providing for local defense, and avoiding the danger of rendering the military commanders too influential—a system which defended the empire for five centuries. The geographical arrangement in themes was introduced by Heraclius, but reorganized by Leo, and bore somewhat the same relation to the previous division into provinces that the departments in France bear to the earlier distribution of that country. In respect of finance, he brought the taxation immediately under the emperor's cognizance, so that thenceforth the emperors were their own finance ministers. All local agencies for collecting the taxes were abolished, and their functions transferred to the imperial officers, who took census regularly. By this means he raised more money than his predecessors, but the increased prosperity of the people showed that the burden did not fall so heavily. In respect of justice, in order to obviate the difficulties which had arisen in the administration of Justinian's elaborate laws, especially since the facilities for communication throughout the empire had decreased, he published in Greek an abridged manual called the *Ecloga*, and codified the military, agricultural and maritime laws. In respect of religion, he aimed at counteracting the element of superstition which had crept into the church, and through it was corrupting the public mind. But this last point calls for separate consideration, since the worship or prohibition of images became the burning question of the age.

The history of iconoclasm is the history of Constantinople during the eighth century and the first half of the ninth, and involved a great part of the empire in its distractions. There can be little doubt that, in his opposition to image worship, Leo represented the opinion of a large part of the enlightened laymen of his time, while the great body of the clergy, but especially the monks, together with the mass of the population, were passionately attached to the statues and pictures, as objects of reverence, not to say of adoration. But the fact that the stronghold of iconoclasm was Asia Minor, and especially that part of it which bordered on the countries occupied by the Saracens, suggests that it was in part owing to the spread of Mahometanism, the rig-

idly guarded spirituality of which creed was a standing protest against more material conceptions of religion. The emperors of this time were those of the Isaurian, Armenian, and Amorion dynasties, all which names remind us that they came from the Asiatic provinces; whereas the great restorer of images the empress Irene, during whose regency the second council of Nicæa in their favor was held (787 A.D.), was an Athenian. But the matter was complicated by a further issue; the question of images was closely connected in the minds of the emperors, and especially of Leo. III. and his hard-handed son Constantine Copronymus, with that of their supremacy in matters of religion. They viewed with jealousy the independent power of the church, and were glad of the opportunity this controversy afforded of strengthening their control over this department, and claiming to the full those ecclesiastical rights which, from the time of Constantine the Great onward, had attached to the imperial authority. As this move was only part of a system of centralization, the monks and others who supported image worship were from one point of view the asserters of liberty against aggression, and they were recognized as such by a certain number of thinking men, who watched with anxiety the growth of despotism. As toleration was unknown to the age, persecution was carried on by both sides with equal fierceness, and the contest swayed to and fro, until it was brought to an end by the final restoration of images under Michael III., the last of the Amorion line (842). Its effects on society had been remarkable. At first its influence was bracing, as was shown by the renewed vigor which pervaded the empire; for both sides were thoroughly in earnest, and among the iconoclasts in particular an element of Puritan energy was evolved. But in its later stages, when the people at large were weary of the strife, and the struggle was felt to be in reality one between church and state, the prevalent hypocrisy generated disrespect for religion, and this was followed by general immorality. It further caused the loss to the empire of its dominions in central Italy. So great was the alienation produced by this movement in the minds of the popes Gregory II. and III. that thenceforward the holy see was for the most part either active in its opposition to the Byzantine power or lukewarm in support of it. At last, in 751, Ravenna was captured by the Lombards, and the Greek exarch retired to Naples.

The history of Greece from the fall of Constantinople to the present day suggests a problem of profound historic interest. From the year 1453 till the end of the eighteenth century almost all the occasions on which the Greek people appear on the page of the historian are occasions on which we read of them that they were butchered or sold into slavery. Records tell only of their annihilation or dispersion. Yet in the commencement of the nineteenth century this apparently annihilated and dispersed people could summon energy enough to resist the Turks, and although in all probability they would have failed to overcome their oppressors if they had been compelled to struggle unaided, yet the courage and self-devotion which they showed in the conflict were such as to gain for them the sympathies of Europe, and they came forth triumphant. But in reading even of their war for independence we are astonished that a remnant was left. Thousands upon thousands perished, and their victory seemed only less terrible than utter defeat. Yet the spirit of life remained. The kingdom of Greece was established, and within forty years, notwithstanding deplorable mistakes in its management, the population is doubled and the country becomes consolidated into a constitutional realm. To trace how these events were possible and



how they actually came to pass is the task of the historian of Modern Greece.

The external events in this history are necessarily few. Greece was during the most of these centuries under the sway of foreigners, and the external history of Greece is formed merely by episodes in the history of these foreigners. When Mahomet II. became master of Constantinople, he did not thereby become master of the Greek empire. The Palæologi had held only a small portion of the territory which had constituted the Greek empire. Most of the islands of the Ægean were under the rule of Italian princes who acted as independent rulers. Rhodes was governed by the knights of St. John. But especially the Venetians owned large possessions in Greece and were also powerful by sea. The external history of Greece is occupied mainly with the efforts of Mahomet II. and his successors to spread their conquests. Mahomet himself conquered the kingdoms of Trebizond, Albania, Eubœa, Greece proper, and part of the Peloponnesus. He was also successful in expeditions against several of the islands of the Ægean, but he failed in his attack on Rhodes. It was not till the end of 1522 that the knights of St. John capitulated to Suleiman I. after standing a siege in which they showed the greatest bravery, and in which the Ottomans, it is said, lost about 100,000 men. On the 1st of January the knights left the island, to go first to Crete and then to Malta. Cyprus and Crete remained still longer in the hands of the Westerns. In 1489 Catherine Cornara ceded the island of Cyprus to the Venetians, who retained possession of it till, in 1570, Piali and Lala Mustapha attacked it. Nikosia fell in September, 1570, and Famagosta in August, 1571, after a brave defense conducted by Marcantonio Bragadino. The Turks received a severe defeat at Lepanto from Don Juan d'Austria in command of the combined fleets of Spain and Italy, in which they lost 130 ships and 30,000 men. But the blow was merely temporary. The helpers of Venice were not united among themselves. Again the Turks became the rulers of the Ægean Sea, and in 1573 Venice had to conclude a humiliating treaty in which she gave up Cyprus. In the case of Crete Venice had to pay for her own severity. That island remained for a long time undisturbed in possession of the queen of the seas, as far as the Ottomans were concerned. But internal commotions agitated it. The Sphakiots or mountaineers of the southwest of Crete—a bold, brave, and independent race of men—rebelled against the rule of the Westerns; and the Venetians had recourse to the most shameful cruelties and atrocities on all their Greek subjects in order to crush the rebellious spirit. The result was that the Greeks hated the Venetians with the bitterest hatred, and would have gladly welcomed a change to the rule of the Turks. The Venetians saw that they had gone too far, and sent a wise politician, Giacomo Foscari, to bring matters to a better state. Many prudent reforms were inaugurated, the Sphakiots were reconciled, and all seemed to promise well. But Foscari died before his reforms got firm hold of the people. The Sphakiots, indeed, from that day to this have never submitted to the Turkish yoke, but the rest of the people were far from willing subjects of the Venetians, and favored an invasion by the Turks. The Turks knew their opportunity, and began an effort to possess the island which, though the Venetians resisted with great perseverance and were backed by other Italians and by the French, ended in the treaty of September 6, 1669, in which they ceded Crete to the Turks. This last acquisition rendered the whole of Greece subject to the Turks with the exception of the Ionian and a few other small islands, which still remained in the hands of the Venetians. The Vene-

tians, however, did not resign their hold on Greece without a final effort to recover possession of it. For this purpose they not only levied soldiers from their own and other Italian communities, but also hired generals and soldiers from Germany. The war began in 1689. The management of it was intrusted to one of the greatest men whom Venice produced, Francesco Morosini, who was ably assisted by a Swedish general, Königsmark. The contest was carried on with great vigor until at length the Turks were driven from the Peloponnesus. The war was brought to an end by the peace of Carlowitz, which left Venice in possession of the Peloponnesus, and the islands of Ægina and Santa Maura. One incident in this war has especially attracted the attention of the civilized world. Morosini, finding his efforts successful in Morea, resolved to advance toward Eubœa. Athens lay in his way. It was garrisoned by the Turks, who, however, on his approach quitted the lower city, and, occupying the Acropolis, prepared to defend it at all hazards. They planted one of their batteries in a breach of the temple of Nike Apteros, and they placed a portion of their powder and many of their valuables in the Parthenon. The Venetians showed no respect for the most beautiful of all buildings; and one of their bombs, falling on the powder in the Parthenon, blew many of the masterpieces of art into a thousand fragments, and utterly defaced the noble building which had remained up till that time very nearly in the condition in which the original architect and sculptor had left it. The Venetians tried to introduce reforms into the Peloponnesus, and had made considerable progress when in 1715 Ali Kumurgi, at the head of a very large Ottoman army, entered the Peloponnesus. The Venetians were unprepared, and they could not easily get assistance from others. The consequence was that in a very short time Kumurgi drove them out of the whole of the peninsula. The Turks got involved at this time in war with Austria; and when peace was finally concluded at Passarowitz, Venice had to give up Morea as well as the island of Ægina, and practically she disappears from the history of Greece except as the possessor of Santa Maura. But a great change had now begun to take place in European politics. At an early period after the capture of Constantinople the Turks came into collision with their neighbors on the north, the empires of Austria and Russia, and we find these two powers united in resisting the inroads of the Ottomans. Even so late as 1683 the Turks were so bold as to advance as far as Vienna and lay siege to it. But in the eighteenth century the policy of Russia attracted the attention of the rest of Europe, and caused a considerable change of attitude. Early in that century Peter the Great had declared his resolution to force his way into Constantinople, and though he was completely balked in his aim, and had to sign an inglorious peace (1711), the desire to have the city on the Bosphorus continued to animate the Russians. It is to Count Münnich, field-marshal and counselor of the Russian empress Anna, that historians attribute the suggestion that Russia should systematically stir up the Greek Christians against their Turkish masters, and from this time (1736) onward we find Russia continually scheming to rouse the Greeks to insurrection. Most famous among these efforts were those of the empress Catharine II., who influenced partly by the Philhellenism of Voltaire, partly by a desire to withdraw the attention of her subjects from domestic affairs, but principally by a wish to gratify her favorite Orloff, formed the project of emancipating the Greeks from the yoke of the Turks (1769). But all the efforts made to effect this object were exceedingly inadequate. The Russians were more successful in their contests with the



Turks in the north, and in 1774 compelled the sultan to accept a peace, called the peace of Kainardji, which contained several provisions bearing upon the Greeks. In some of these the sultan promised to protect the Christian religion and Christian churches, and though no special mention was made of Russia, her statesmen saw in this stipulation an opening for endless opportunities to interfere. And from this time forward Russia has claimed to be the champion of the Christians against the Turks. But the other states of Europe, especially France and England, became suspicious of the designs of Russia, and holding to the balance of power as an essential principle of European statesmanship, they determined to maintain the integrity of the Turkish empire. Austria had frequently joined with Russia in opposing the Turks, and had again and again hoped to come in for a share of the spoil when Turkey should be partitioned. But toward the end of the eighteenth century the increasing power and influence of Russia began to alarm her, and when the Greeks rose to assert their independence, no power more tenaciously adhered to the doctrine that the integrity of the Turkish empire was demanded by the balance of power in Europe.

The notable fact in Greek history during these ages is the disappearance and the apparent destruction of the nation. Whoever might hold the supreme power in Greece, the Greeks were sure to be the sufferers. When the Turks spread their conquests from Constantinople on to the rest of the empire, every capture of a city was followed by the slaughter of the able-bodied men and the carrying off of the women and children to the harem or slave market. And the Western Christians were not a whit more tender than the Ottomans. The Venetians were wroth with the Greeks because they did not acknowledge the pope, and in the island of Crete perpetrated the most abominable barbarities on the innocent population. The Turks punished the Greeks because they submitted to the Venetians, and the Venetians punished them because they submitted to the Turks. Moreover, in these times the *Ægean* was infested by pirates who, whether Turks or Italians or Greeks, had no mercy on the peaceful inhabitants of the mainland. Human life was disregarded, and men and women were of value only in so far as they were salable articles in the slave market. We have to add to this record of destruction that vast masses of the people removed to Italy or Sicily or some other place of refuge. Almost all the famous families that ruled the islands of the *Ægean* escaped from them when they were attacked by the Turks. The knights of St. John, for instance, left Rhodes to find a final settlement in Malta. Among the number who thus left their native land were nearly all the learned men, who sought in the West a refuge from Turkish rule, and opportunities for the pursuit of learning.

The great bond of sympathy which attached the various Greeks together during the sixteenth and seventeenth centuries was their religion. But a new inspiration came with the advance of culture in the end of the eighteenth and the beginning of the nineteenth century. They began to be animated by the feeling of nationality. The French Revolution roused their minds into activity, and they were ashamed that a nation which had played such a grand part in the early civilization of mankind should be the slaves of an illiterate and barbarous horde of aliens. Circumstances favored the movement. Especially prominent amongst these was the conduct of Ali Pasha, the tyrant of Jannina. This daring and unscrupulous despot conceived the idea of cutting his connection with the sultan and assuming the absolute government of Albania. His effort showed how weak the Turkish empire was, and how loosely it held

together. Stimulating also was the conduct of the Suliotes, who performed prodigies of valor in their resolution to defend their homes and their liberties. A secret society was formed to make ready for a rising of the people. The people were stimulated by patriotic songs, especially those of Rhigas of Velesino; and the agents of Russia were everywhere.

Accordingly in 1821 the war for independence broke out. It would be impossible in the limits of an article like this to give a proper account of the various conflicts between Greeks and Turks, of the quarrels among the Greeks themselves, and the windings of European diplomacy in its interference in the contest. The principal events may be shortly noted. The insurrection was begun by Prince Alexander Hypsilantes, a phanariot in the service of Russia, who had been elected head of the chief secret society. He crossed the Pruth March 6, 1821, with a few followers, and was soon joined by several men of great bravery at the head of considerable troops. But the expedition was badly managed, and in June Hypsilantes fled to Austria, having entirely failed in his object. And in all the efforts to overthrow the power of the Turks in the northern provinces the Greeks failed, though some men fought very bravely. In the Peloponnesus the insurrection broke out also in March in several places, and most prominent among the first movers was Germanos, archbishop of Patras. Everywhere the Greeks drove the Turks before them; they were so successful that in January, 1822, the independence of Greece was proclaimed. Prominent among the Greek patriots was Marco Bozzaris, who waged an uncompromising war with the Turks from 1820 to 1823, being killed at Mesolonghi in the latter year. But they soon began to quarrel among themselves. Several assemblies were held. Mavrocordatos, one of the phanariots, was appointed president. But the aspirants for honors and rewards were numberless, and they could not agree. Accordingly a civil war raged in 1823 and 1824, inspired by Colocotronis, a chief of klephts who attained great influence, and in 1824 another civil war of short duration, called the war of the Primates. During this period the Greek fleet was very active, and did good service. It was ably led by Miaoulis, a man of firm character and great skill. And he was well seconded by the intrepid Canaris, whose fire ships did immense damage to the Turkish fleet, and filled the Turkish sailors with indescribable terror. For the ravages of the Greek fleet the Turks wreaked fearful vengeance on the innocent inhabitants of the lovely island of Ghios (April, 1822), butchering in cold blood multitudes of its peaceful inhabitants, and carrying off others to the slave market. The savage atrocities then perpetrated caused a thrill of horror throughout the civilized world. Two years after they perpetrated similar outrages on the islands of Kasos and Psara. The sultan now invoked the aid of Mehemet Ali, pasha of Egypt, and his stepson Ibrahim landed on the Peloponnesus with a band of well-disciplined Arabs in 1824. Ibrahim carried everything before him, and the Greeks lost nearly every place that they had acquired. Some towns offered a strong resistance, and especially famous is the siege of Mesolonghi, which lasted from April 27, 1825, to April 22, 1826. Nothing could exceed the firmness and bravery displayed by Greek men and women during that siege; and their glorious deeds and sad fate attracted the attention of all Europe. The interest in the Greeks, which had been to some extent aroused by Lord Byron and other English Philhellenes in 1823, now became intense, and volunteers appeared from France and Germany, as well as from England and America. Lord Cochrane was appointed admiral of the Greek fleet, and Sir Richard Church generalissimo of the land forces,



but they did not prevent the capture of Athens by the Turks, June 2, 1827. Most of the European governments had remained indifferent, or had actually discouraged the outbreak of the Greeks. Russia had disowned Hypsilantes. The monarchs of Europe were afraid that the rising of the Greeks was only another eruption of democratic feeling fostered by the French revolution, and thought that it ought to be suppressed. But the vast masses of the people were now interested, and demanded from their governments a more liberal treatment of Greece. Canning inaugurated in 1823, and now carried out this new policy in England. An accident came to the aid of the Greeks. The fleets of England, France and Russia were cruising about the coasts of the Peloponnesus, to prevent the Turkish fleet ravaging the Greek islands or mainland. Winter coming on, the admirals thought it more prudent to anchor in the Bay of Navarino, where the Turkish fleet lay. The Turks regarded their approach as prompted by hostile feelings and commenced firing on them, whereupon a general engagement ensued, in which the Turkish fleet was annihilated, October 20, 1827. Shortly after (January 18, 1828) Capodistrias, who had been in the service of Russia, was appointed president of Greece for seven years, the French cleared the Morea of hostile Turks, and Greece was practically independent. But several years had to elapse ere affairs reached a settled condition. Capodistrias was Russian in his idea of government, and, ruling with a high hand, gave great offense to the masses of the people; and his rule came to an untimely end by his assassination on October 9, 1831. Anarchy followed, but at length Otho of Bavaria was made king, and the protecting powers signed a convention by which the present limits were definitely assigned to the new kingdom (1832). Henceforth Greece has existed as a recognized independent kingdom. Throughout the whole of the war of independence in Greece, the people behaved with great bravery and self-sacrifice. They showed a steady adherence to the idea of liberty. They were sometimes savage in their conduct to the Turks, and barbarities occurred which stain their history. But no single man arose during the period capable of being in all respects a worthy leader. Nor can this be wondered at. All the men who took a prominent part in the movements had received their training in schools where constitutionalism was the last doctrine that was likely to be impressed on them. It could not be expected that such men would act with great mercy or prudence in dealing with Turks who had butchered or enslaved their kinsmen and kinswomen for generations. Even among the foreigners who volunteered to aid the Greeks, few, if any, were found of supreme ability, and after the kingdom was established the Greeks were unfortunate in the strangers who came to direct them. Otho had been brought up in a despotic court, and knew no other method of ruling. He brought along with him Bavarians, to whom he intrusted the entire power, and the Greeks had the mortification of knowing that, though their kingdom was independent, no Greek had a chance of being elevated to any ministerial office of importance. Accordingly, a revolution broke out in 1843; the Bavarians were dismissed, and Otho agreed to rule through responsible ministers and a representative assembly. But he failed to fulfill his promise. Discontent reached its height in 1862, when another revolution broke out and Otho had to leave Greece. The great mass of the people longed for a constitutional monarchy, and gave a striking proof of this by electing Prince Alfred king of Greece. The choice was determined by universal suffrage, and out of 241,202 Greek citizens who voted, 230,016 recorded their votes in favor of the English prince. The vote meant simply that the Greek people

were tired of unconstitutional princes, and hoped that they would end their troubles if they had a prince accustomed to see parliamentary government respected and enforced. The three protecting powers—England, France and Russia—had, however, bound themselves to allow no one related to their own ruling families to become king of Greece. When the Greek people received this news, they begged England to name a king, and after several refusals England found one in Prince William of Schleswig-Holstein, son of the king of Denmark. The Greek people accepted him, and in 1863 he became king with the name of George I. Britain added the Ionian islands to his kingdom. In 1875 the ministry gave great offense to the Greek people by its unconstitutional procedure, but the king persisted in standing by it. The people, however, persevered in the use of legitimate means to oust the ministry; the king at last prudently yielded, and thus a revolution was prevented. The effort of the Greeks to extend their boundaries is the last phase of their history, and is still in progress. In 1853, when the Crimean war broke out, the Greeks sided with the Russians, and in 1854 they made inroads into Thessaly and Epirus, but English and French troops landed at the Piræus, and forcibly put an end to the Russian alliance and to Greek ideas of acquiring additional territory. In 1866 to 1869 the Cretans struggled bravely, but unsuccessfully, to throw off the Turkish yoke and become a part of the Greek kingdom. More recently, when the Russians made war on the Turks, the Greeks were eager to enter Thessaly and Epirus to aid their fellow-countrymen in asserting their freedom. But England interfered with the promise that Greece would gain more by maintaining a peaceful attitude. A clause in the Berlin Treaty afforded a basis for the fulfillment of this promise; and in 1881 Thessaly and Epirus were ceded to Greece by Turkey, which yielded to pressure from the great powers. The Greeks themselves believe that with the extension of their boundaries there will be less occasion for intrigue, ministries will be more permanent, and the Greeks who now flock from all parts to the little kingdom of Greece for official employment will have a wider sphere and will be more contented.

The population of Greece, according to the latest statistics, is upward of 1,900,000; that of Athens in 1889 amounted to 107,746. The national debt at the same period was 556,645,046 drachmas. During 1888 the aggregate value of imports and exports was 204,803,000 drachmas; 5,976 vessels entered and 5,462 vessels cleared Greek ports, the Greek merchantmen giving employment to 21,591 sailors. There are 8,100 kilometers of telegraph lines in operation, and considerable progress has been made in the construction of railroads. In 1889 the army consisted of 26,113 men rank and file, and the navy of 2,945 men.

#### GREEK LANGUAGE AND LITERATURE.

The possession of a common language was always regarded by the Greeks themselves as the most significant and important of the bonds which united the scattered members of the Hellenic nationality. Wherever there was a community speaking the Greek tongue, whether in Europe, Asia or Africa, from Olbia on the Hypanis to Cyrene in Libya, from Salamis in Cyprus to Mælaça near the Pillars of Hercules, there was a portion of the Hellenic people linked to the rest by mutual intelligibility, and sharply marked off from the jabbering and inarticulate *barbarians* who surrounded them. The earliest written records of this speech are probably to be found in what was at the same time the most precious common possession of this great nationality, the poems that bear the name of Homer. It is possible indeed that, in the form in which they have come down to us,



they are later than the fragments of the earliest elegiac and iambic poets, such as Callinus, Mimnermus, Archilochus and Simonides of Amorgus; but it cannot be doubted that in substance they go back to an earlier date. These, however, are in a literary language — a language which bears the most evident marks of a free combination for artistic purposes of various popular dialects, along with many reminiscences of archaic forms and usages, and not a few formations due only to false analogy. For the early history of the Greek language we are obliged to have recourse to the reconstructions of linguistic science.

Comparative philology shows us that there was a time when the ancestors of the various nations which speak what are generally known as Indo-Germanic languages lived together and had a common speech. From the extent and character of the agreement between these various languages at the time when they first become known to us from written records, it is possible to a certain extent to determine which groups remained the longest in connection with each other, and which parted off the soonest from the common stock. Unfortunately scholars are as yet by no means at one as to the results to which this method of inquiry leads us. Schleicher, *e.g.*, held that the agreement between the Aryan or Asiatic group of languages and the South-European (in which he includes not only Greek and Italian, but also Celtic) is closer and more significant than that between the latter and the North-European, *i.e.*, the Teutonic and the Letto-Slavonic group. Max Müller and Joh. Schmidt maintain that the relations of the various languages are so complicated that it is impossible to establish any "genealogical tree," or to determine the order in which they separated from each other. But the prevailing view is still that of Lottner, Curtius, Jolly, Fick and Scherer, that we may with confidence assume the first division to have been that between the Aryan or Asiatic (Indo-Persian) and the European groups, and that there are sufficient points of agreement between all the European languages to warrant us in assuming that there was a period of some duration during which the European peoples remained united.

At the time when the common Indo-European unity was first broken up, the language had reached a stage of development which may be given with some confidence as follows: The steps assumed are those which have been established by Professor Curtius in his monograph. In spite of the criticisms to which this scheme has been subjected, by far the most important of which are those by Max Müller and Ascoli, it may fairly be said to maintain its ground, and it is reasserted with full confidence in Curtius' admirable work on the Greek verb.

The history of Greek literature has had three great stages — the Old Literature, from the earliest times to 529 A.D., when the edict of Justinian closed the schools of pagan philosophy; the Byzantine Literature, from 529 A.D. to the taking of Constantinople by the Turks in 1453; and the Modern Literature, which may be said to have begun with the satirical poetry of Theodorus Prodromus in the twelfth century.

The Old Literature, to 529 A.D., falls into three periods. I. *The Early Literature*, to about 475 B.C. Epic, elegiac, iambic, and lyric poetry; the beginnings of literary prose. II. *The Attic Literature*, 475–300 B.C. Tragic and comic drama; historical, oratorical, and philosophical prose. III. *The Literature of the Decadence*, 300 B.C. to 529 A.D., — which may again be divided into (1) the Alexandrian period, 300–146 B.C., and (2) the Græco-Roman period, 146 B.C. to 529 A.D.

It is not the purpose of the present article to enter

into details regarding particular works or the lives of their authors. These will be found in the separate articles devoted to the principal Greek writers. The object of the following pages will be to sketch the literary development as a whole, to show how its successive periods were related to each other, and to mark the dominant characteristics of each.

A process of natural growth may be traced through all the best work of the Greek genius. The Greeks were not literary imitators of foreign models; the forms of poetry and prose in which they attained to such unequalled excellence were first developed by themselves. Their literature had its roots in their political and social life; it is the spontaneous expression of that life in youth, maturity, and decay; and the order in which its several fruits are produced is not the result of accident or caprice. The series of its seasons is as much the result of natural laws as the sequence of spring, summer, and autumn. Further, the old Greek literature has a striking completeness, due to the fact that each great branch of the Hellenic race bore a characteristic part in its development. Ionians, Æolians, Dorians, in turn contributed their share. Each dialect corresponded to a certain aspect of Hellenic life and character. Each found its appropriate work.

The Ionians on the coast of Asia Minor — a lively and genial people, delighting in adventure, and keenly sensitive to everything bright and joyous — created artistic epic poetry out of the lays in which Æolic minstrels sang of the old Achæan wars. And among the Ionians arose elegiac poetry, the first variation on the epic type. These found a fitting instrument in the harmonious Ionic dialect, the flexible utterance of a quick and versatile intelligence. The Æolians of Lesbos next created the lyric of personal passion, in which the traits of their race — its chivalrous pride, its bold but sensuous fancy — found a fitting voice in the fiery strength and tenderness of Æolic speech. The Dorians of the Peloponnesus, Sicily, and Magna Græcia then perfected the choral lyric for festivals and religious worship; and here again an earnest faith, a strong pride in Dorian usage and renown, had an apt interpreter in the massive and sonorous Doric. Finally, the Attic branch of the Ionian stock produced the drama, blending elements of all the other kinds, and developed an artistic literary prose in history, oratory, and philosophy. It is in the Attic literature that the Greek mind receives its most complete interpretation.

Extant Greek literature begins with the Homeric poems. These are works of art which imply a long period of antecedent poetical cultivation. Of the pre-Homeric poetry we have no remains, and very little knowledge. Such glimpses as we get of it connect it with two different stages in the religion of the prehistoric Hellenes.

War-ballads were the materials from which the earliest epic poetry of Greece was constructed. By an "epic" poem the Greeks meant a narrative of heroic action in hexameter verse. The term *epe* meant at first simply "verses;" it acquired its special meaning only when *mele*, lyric songs set to music, came to be distinguished from *epe*, verses not set to music, but merely recited. Epic poetry is the only kind of extant Greek poetry which is older than about 700 B.C. The early epos of Greece is represented by the *Iliad* and the *Odyssey*, Hesiod, and the Homeric hymns; also by some fragments of the "Cyclic" poets.

After the Dorian conquest of the Peloponnesus, the Æolian emigrants who settled in the northwest of Asia Minor brought with them the warlike legends of their chiefs, the Achæan princes of old. These legends lived in the ballads of the Æolic minstrels, and from them



passed southward into Ionia, where the Ionian poets gradually shaped them into higher artistic forms. Among the seven places which claimed to be the birth-place of Homer, that which has the best title is Smyrna. Homer himself is called "son of Meles"—the stream which flowed though old Smyrna, on the border between Æolia and Ionia. The tradition is significant in regard to the origin and character of the *Iliad*, for in the *Iliad* we have Achæan ballads worked up by Ionian art. A preponderance of evidence is in favor of the view that the *Odyssey* also, at least in its earliest form, was composed on the Ionian coast of Asia Minor. According to the Spartan account, Lycurgus was the first to bring to Greece a complete copy of the Homeric poems, which he had obtained from the Creophylidæ, a clan or guild of poets in Samos. A better authenticated tradition connects Athens with early attempts to preserve the chief poetical treasure of the nation. Solon, it has been thought, enacted that the poems should be recited from an authorized text; Hipparchus, that they should be recited in a regular order. At any rate, we know that in the sixth century B.C. a recitation of the poems of Homer was one of the established competitions at the Panathenæa, held once in four years. The reciter was called a *rhapsodist*—properly one who weaves a long, smoothly-flowing chant, then an epic poet who chants his own or another's poem. The rhapsodist did not, like the early minstrel, use the accompaniment of the harp; he gave the verses in a flowing recitative, bearing in his hand a branch of laurel, the symbol of Apollo's inspiration. In the fifth century B.C. we find that various Greek cities had their own editions of the poems, for recitation at their festivals. Among these were the editions of Massilia, of Chios, and of Argos. There were also editions bearing the name of the individual editor—the best known being that which Aristotle prepared for Alexander. The recension of the poems by Aristarchus (156 B.C.) became the standard one, and is probably that on which the existing text is based. The oldest Homeric MS. extant, Venetus A of the *Iliad*, is of the tenth century; the first printed edition of Homer was that edited by the Byzantine Demetrius Chalcondyles (Florence, 1488). The first Aldine edition appeared twelve years later.

The ancient Greeks were almost unanimous in believing the *Iliad* and the *Odyssey* to be the work of one man, Homer, to whom they also ascribed some extant hymns, and probably much more besides. Aristotle and Aristarchus seem to have put Homer's date about 1044 B.C., Herodotus about 850 B.C. It was not till about 170 B.C. that the grammarians Hellanicus and Xenon put forward the view that Homer was the author of the *Iliad*, but not of the *Odyssey*. Those who followed them in assigning different authors to the two poems were called the Separaters (or *Chorizontes*). It is now generally admitted that the *Iliad* and the *Odyssey*, whatever their absolute or relative ages, must at least be regarded as belonging to the maturity of a poetical school in Ionia, which had gradually created an epic style. Next, it can no longer be doubted that the *Iliad* contains elements of various age and origin; the form and the matter alike show this, though we cannot with certainty point to any one group of these elements as the original nucleus around which our *Iliad* grew. Comparing the *Odyssey* with the *Iliad*, we perceive greater unity of design and of coloring, and indications of a somewhat later time; but not even here can we affirm that the poem, as we have it, is the work of one man.

The Ionian school of epos produced a number of poems founded on the legends of the Trojan war, and intended as introductions or continuations to the *Iliad*

and the *Odyssey*. The name of "epic cycle" was properly applied to a prose compilation of abstracts from these epics, pieced together in the order of the events. The compilers were called "cyclic" writers, and the term has now been transferred to the epic poets whom they used.

The epic poetry of Ionia celebrated the great deeds of heroes in the old wars. But in Greece proper there arose another school of epos, which busied itself with religious lore and ethical precepts, especially in relation to the rural life of Bœotia. This school is represented by the name of Hesiod. The legend spoke of him as vanquishing Homer in a poetical contest at Chalcis, in Eubœa; and it expresses the fact that, to the old Greek mind, these two names stood for two contrasted epic types. Nothing is certainly known of his date, except that it must have been subsequent to the maturity of Ionian epos. He is conjecturally placed about 850–800 B.C., but some would refer him to the earlier part of the seventh century B.C. In Hesiod's *Works and Days* we have the earliest example of a didactic poem. The seasons and the labors of the Bœotian farmer's year are followed by a list of the days which are lucky or unlucky for work. The *Theogony*, or "Origin of the Gods," describes first how the visible order of nature arose out of chaos; next, how the gods were born.

The elegiac meter is, in form, a simple variation on the epic meter, obtained by docking the second of two hexameters so as to make it a verse of five feet or measures. But the poetical capabilities of the elegiac couplet are of a wholly different kind from those of heroic verse. *Elegos* seems to be the Greek form of a name given by the Carians and Lydians to a lament for the dead. This was accompanied by the soft music of the Lydian flute, which continued to be associated with Greek elegy. The non-Hellenic origin of elegy is indicated by this very fact. The flute was to the Greeks an Asiatic instrument,—string instruments were those which they made their own,—and it would hardly have been wedded by them to a species of poetry which had arisen among themselves. The early elegiac poetry of Greece was by no means confined to mourning for the dead. War, love, politics, proverbial philosophy, were in turn its themes; it dealt, in fact, with the chief interest of the poet and his friends, whatever that might be at the time. It is the direct expression of the poet's own thoughts, addressed to a sympathizing society. This is its first characteristic. The second is that, even when most pathetic or most spirited, it still preserves, on the whole, the tone of conversation or of narrative.

Elegy, as we have seen, was the first slight deviation from epos. But almost at the same time another species arose which had nothing in common with epos, either in form or in spirit. This was the iambic. The word *iambos* (*iapto*, to dart or shoot) was used in reference to the licensed raillery at the festivals of Demeter; it was the maiden Iambe, the myth said, who drew the first smile from the mourning goddess. The iambic meter was at first used for satire; and it was in this strain that it was chiefly employed by its earliest master of note, Archilochus of Paros, (670 B.C.) But it was adapted to the expression generally of any pointed thought. Thus it was suitable to fables.

The lyric poetry of early Greece may be regarded as the final form of that effort at self-expression which in the elegiac and iambic is still incomplete. The lyric expression is deeper and more impassioned. Its intimate union with music and with the rhythmical movement of the dance gives to it more of an ideal character. At the same time the continuity of the music permits pauses to the voice, pauses necessary as reliefs after a climax. Before lyric poetry could be effective, it was necessary



that some progress should have been made in the art of music. The instrument used by the Greeks to accompany the voice was the four-stringed lyre, and the first great epoch in Greek music was when Terpander of Lesbos (660 B.C.), by adding three strings, gave the lyre the compass of the octave. Further improvements are ascribed to Olympus and Thaletas. By 500 B.C. Greek music had probably acquired all the powers of expression which the lyric poet could demand. The period of Greek lyric poetry may be roughly defined as from 670 to 440 B.C. Two different parts in its development were taken by the Æolians and the Dorians.

The culmination of the lyric poetry is marked by two great names, Simonides and Pindar. Simonides was an Ionian of the island of Ceos, but his lyrics belonged by form to the choral Dorian school. Many of his subjects were taken from the events of the Persian wars: his epitaphs on those who fell at Thermopylæ and Salamis were celebrated. In him the lyric art of the Dorians is interpreted by Ionian genius, and Athens—where part of his life was passed—is the point at which they meet. Simonides is the first Greek lyricist whose significance is not merely Æolian or Dorian, but Panhellenic. The same character belongs even more completely to his younger contemporary. Pindar was born in Bœotia of a Dorian stock; thus, as Ionian and Dorian elements meet in Simonides, so Dorian and Æolian elements meet in Pindar. Simonides was perhaps the most tender and most exquisite of the lyric poets. Pindar was the boldest, the most fervid and the most sublime. His extant fragments represent almost every branch of the lyric art. But he is known to us mainly by forty-four *Epinicia*, or odes of victory, for the Olympian, Pythian, Nemean and Isthmian festivals. The general characteristic of the treatment is that the particular victory is made the occasion of introducing heroic legends connected with the family or city of the victor, and of inculcating the moral lessons which they teach. No Greek lyric poetry can be completely appreciated apart from the music, now lost, to which it was set. Pindar's odes were, further, essentially occasional poems; they abound in allusions of which the effect is partly or wholly lost on us; and the glories which they celebrate belong to a life which we can but imperfectly realize. Of all the Greek poets Pindar is perhaps the one to whom it is hardest for us to do justice; yet we can at least recognize his splendor of imagination, his strong rapidity, and his soaring flight.

The Ionians of Asia Minor, the Æolians, and the Dorians had now performed their special parts in the development of Greek literature. Epic poetry had interpreted the heroic legends of warlike deeds done by Zeus-nourished kings and chiefs. A new form of poetry was now to be created, with elements borrowed from all the rest. And this was to be achieved by the people of Attica, in whose character and language the distinctive traits of an Ionian descent were tempered with some of the best qualities of the Dorian stock.

The drama arose from the festivals of Dionysus, the god of wine, which were held at intervals from the beginning of winter to the beginning of spring. A troop of rustic worshipers would gather around the altar of the god, and sing a hymn in his honor, telling of his victories or sufferings in his progress over the earth. "Tragedy" meant "the goat-song," a goat being sacrificed to Dionysus before the hymn was sung. "Comedy," "the village song," is the same hymn regarded as an occasion for rustic jest. Then the leader of the chorus would assume the part of a messenger from Dionysus, or even that of the god himself, and recite an adventure to the worshipers, who made choral response. The next step was to arrange a dialogue be-

tween the leader (*coryphæus*) and one chosen member of the chorus, hence called "the answerer" (*hypocrites*, afterward the ordinary word for "actor"). This last improvement is ascribed to the Attic Thespis, (about 536 B.C.) The elements of drama were now ready.

Æschylus (born 525 B.C.) became the real founder of tragedy by introducing a second actor, and thus rendering the dialogue independent of the chorus. At the same time the choral song—hitherto the principal part of the performance—became subordinate to the dialogue; and drama was mature. Æschylus is also said to have made various improvements of detail in costume and the like; and it was early in his career that the theater of Dionysus under the Acropolis was commenced—the first permanent home of Greek drama, in place of the temporary wooden platforms which had hitherto been used. The system of the "trilogy" and the "tetralogy" is further ascribed to Æschylus,—the "trilogy" being properly a series of three tragedies connected in subject, such as the *Agamemnon*, *Choephoroi*, *Eumenides*, which together form the *Oresteia*, or Story of Orestes. Sophocles, who was born thirty years after Æschylus (495 B.C.), is the most perfect artist of the ancient drama. No one before or after him gave to Greek tragedy so high a degree of ideal beauty, or appreciated so finely the possibilities and the limitations of its sphere. He excels especially in drawing character; his *Antigone*, his *Ajax*, his *Ædipus*—indeed, all the chief persons of his dramas—are typical studies in the great primary emotions of human nature. He gave a freer scope to tragic dialogue by adding a third actor; and in one of his later plays, the *Ædipus at Colonus*, a fourth actor is required. From the time when he won the tragic prize against Æschylus in 468 to his death in 405 B.C. he was the favorite dramatist of Athens; and for us he is not only a great dramatist, but also the most spiritual representative of the age of Pericles. The distinctive interest of Euripides is of another kind. He was only fifteen years younger than Sophocles; but when he entered on his poetical career, the old inspirations of tragedy were already failing. Euripides marks a period of transition in the tragic art, and is, in fact, the mediator between the classical and the romantic drama.

In Attica, as in England, a period of rather less than fifty years sufficed for the complete development of the tragic art. The two distinctive characteristics of Athenian drama are its originality and its abundance. The Greeks of Attica were not the only inventors of drama, but they were the first people who made drama a complete work of art. And the great tragic poets of Attica were remarkably prolific. Æschylus was the reputed author of seventy tragedies, Sophocles of one hundred and thirteen, Euripides of ninety-two; and there were others whose productiveness was equally great.

Comedy represented the lighter side, as tragedy the graver side, of the Dionysiac worship; it was the joy of spring following the gloom of winter. The process of growth was nearly the same as in tragedy; but the Dorians, not the Ionians of Attica, were the first who added dialogue to the comic chorus. Susarion, a Dorian of Megara, exhibited about 580 B.C. pieces of the kind known as *Megarian farces*. The more artistic form of comedy seems, however, to have been developed in Attica. The greatest names before Aristophanes are those of Cratinus and Eupolis; but from about 470 B.C. there seems to have been a continuous succession of comic dramatists. Aristophanes came forward as a comic poet in 427 B.C., and retained his popularity for about forty years. He presents a perhaps unique union of bold fancy, exquisite humor,



critical acumen, and lyrical power. His eleven extant comedies may be divided into three groups according as the license of political satire becomes more and more restricted. In the *Acharnians*, *Knights*, *Clouds*, *Wasps*, and *Peace* (425-421) the poet uses unrestrained freedom. In the *Birds*, *Lysistrata*, *Thesmophoriazusa*, and *Frogs* (414-405) a greater reserve may be perceived. Lastly, in the *Ecclesiazusa* and the *Plutus* (392-388) personal satire is almost wholly avoided.

The development of Greek poetry had been completed before a prose literature had begun to exist. The earliest name in extant Greek prose literature is that of Herodotus; and, when he wrote, the Attic drama had already passed its prime. There had been, indeed, writers of prose before Herodotus; but there had not been, in the proper sense of the term, a prose literature. The causes of this comparatively late origin of Greek literary prose are independent of the question as to the time at which the art of writing began to be generally used for literary purposes. Epic poetry exercised for a long period a sovereign spell over the Greek mind. In it was deposited all that the race possessed of history, theology, philosophy, oratory.

The sense and the degree in which Herodotus was original may be inferred from what is known of earlier prose-writers. For about a century before Herodotus there had been a series of writers in philosophy, mythology, geography, and history. The earliest, or among the earliest, of the philosophical writers were Pherecydes of Syros (550 B.C.) and the Ionian Anaximenes and Anaximander.

Herodotus was born in 484 B.C.; and his history was probably not completed before the beginning of the Peloponnesian War, (431 B.C.) His subject is the struggle between Greece and Asia, which he deduces from the legendary rape of the Argive Io by Phoenicians, and traces down to the final victory of the Greeks over the invading host of Xerxes. His literary kinship with the historical or geographical writers who had preceded him is seen mainly in two things. First, though he draws a line between the mythological and the historical age, he still holds that myths, as such, are worthy to be reported, and that in certain cases it is part of his duty to report them. Secondly, he follows the example of such writers as Hecataeus in describing the natural and social features of countries. He seeks to combine the part of the geographer or intelligent traveler with his proper part as historian. But when we turn from these minor traits to the larger aspects of his work, Herodotus stands forth as an artist whose conception and whose method were his own. His history has an epic unity.

Thucydides was only thirteen years younger than Herodotus; but the intellectual space between the men is so great that they seem to belong to different ages. Herodotus is the first artist in historical writing; Thucydides is the first thinker. The subject of Thucydides is the Peloponnesian War. In resolving to write its history, he was moved, he says, by these considerations. It was probably the greatest movement which had ever affected Hellas collectively. It was not possible for him as a contemporary to record it with approximate accuracy. And this record was likely to have a general value, over and above its particular interest as a record, seeing that the political future was likely to resemble the political past. This is what Thucydides means when he calls his work "a possession forever." The speeches which he ascribes to the persons of the history are, as regards form, his own essays in rhetoric of the school to which Antiphon belongs. As regards matter, they are always so far dramatic that the thoughts and sentiments are such as he conceived possible for the supposed

speaker. Thucydides abstains, as a rule, from moral comment; but he tells his story as no one could have told it who did not profoundly feel its tragic force; and his general claim to the merit of impartiality is not invalidated by the possible exceptions—difficult to estimate—in the cases of Cleon and Hyperbolus.

Strong as is the contrast between Herodotus and Thucydides, their words have yet a character which distinguish both alike from the historical work of Xenophon in the *Anabasis* and the *Hellenica*. Herodotus gives us a vivid drama with the unity of an epic. Thucydides takes a great chapter of contemporary history, and traces the causes which are at work throughout it, so as to give the whole a scientific unity. Xenophon has not the grasp either of the dramatist or of the philosopher. His work does not possess the higher unity either of art or of science. The true distinction of Xenophon consists in his thorough combination of the practical with the literary character. He was an accomplished soldier who had done and seen much. He was also a good writer, who could make a story both clear and lively. The seven books of the *Hellenica* form a supplement to the history of Thucydides, beginning in 411 and going down to 362 B.C. The chief blot on the *Hellenica* is the author's partiality to Sparta, and in particular to Agesilaus. Some of the greatest achievements of Epaminondas and Pelopidas are passed over in silence. On the whole, Xenophon is perhaps seen at his best in his narrative of the *Retreat of the Ten Thousand*—a subject which exactly suits him.

The steps by which an Attic prose style was developed, and the principal forms which it assumed, can be traced most clearly in the Attic orators. Every Athenian citizen who aspired to take part in the affairs of the city, or even to be qualified for self-defense before the law-court, required to have some degree of skill in public speaking; and an Athenian audience looked upon public debate, whether political or forensic, as a competitive trial of proficiency in a fine art. Hence the speaker, no less than the writer, was necessarily a student of finished expression; and oratory had a more direct influence on the general structure of literary prose than has ever perhaps been the case elsewhere. A systematic rhetoric took its rise in Sicily, where Corax of Syracuse (466 B.C.) devised his *Art of Words* to assist those who were pleading before the law-courts; and it was brought to Athens by his disciple Tisias.

Antiphon represents the earliest, and what has been called the grand, style of Attic prose; its chief characteristics are a grave, dignified movement, a frequent emphasis on verbal contrasts, and a certain austere elevation. Lysias, the representative of the "plain style," breaks through the rigid mannerism of the elder school, and uses the language of daily life with an ease and grace which, though the result of study, do not betray their art. Isocrates, whose manner may be regarded as intermediate between that of Antiphon and that of Lysias, wrote for readers rather than for hearers. The type of literary prose which he founded is distinguished by ample periods, by studied smoothness, and by the temperate use of rhetorical ornament. From the middle of the fourteenth century B.C. the Isocratic style of prose became general in Greek literature. Demosthenes excels all other masters of Greek prose not only in power but in variety; his political speeches, his oration in public or private causes, show his consummate and versatile command over all the resources of the language. In him the development of Attic prose is completed, and the best elements in each of its earlier phases are united. The modern world can more easily appreciate Demosthenes as a great natural orator than as an elaborate artist.



But, in order to apprehend his place in the history of Attic prose, we must remember that the ancients felt him to be both; and that he was even reproached by detractors with excessive study of effect. Æschines is the most theatrical of the Greek orators; he is vehement, and often brilliant, but seldom persuasive. Hyperides was, after Demosthenes, probably the most effective; he had much of the grace of Lysias, but also a wit, a fire, and a pathos which were his own. The one oration of Lycurgus which remains to us is earnest and stately, reminding us both of Antiphon and of Isocrates. Dinarchus was merely a bad imitator of Demosthenes. There seems more reason to regret that Demades is not represented by larger fragments. The decline of Attic oratory may be dated from Demetrius of Phalerum (318 B.C.), the pupil of Aristotle. Cicero names him as the first who impaired the vigor of the earlier eloquence, "preferring his own sweetness to the weight and dignity of his predecessors."

The place of Plato in the history of Greek literature is as unique as his place in the history of Greek thought. The literary genius shown in the dialogues is many-sided; it includes dramatic power, remarkable skill in parody, a subtle faculty of satire, and, generally, a command over the finer tones of language. In passages of continuous exposition, where the argument rises into the higher regions of discussion, Plato's prose takes a more decidedly poetical coloring—never florid or sentimental, however, but lofty and austere. In Plato's later works—such, for instance, as the *Laws*, *Timæus*, *Critias*—we can perceive that his style did not remain unaffected by the smooth literary prose which contemporary writers had developed. Aristotle's influence on the form of Attic prose literature would probably have been considerable if his *Rhetoric* had been published while Attic oratory had still a vigorous life before it. But in this, as in other departments of mental effort, it was Aristotle's lot to set in order what the Greek intellect had done in that creative period which had now come to an end. His own chief contribution to the original achievements of the race was the most fitting one that could have been made by him in whose lifetime they were closed. He bequeathed an instrument by which analysis could be carried further, he founded a science of reasoning, and left those who followed him to apply it in all those provinces of knowledge which he had mapped out. Theophrastus, his pupil and his successor in the Lyceum, opens the new age of research and scientific classification with his extant works on botany, but is better known to modern readers by his lively *Characters*, the prototypes of such sketches in our own literature as those of Hall, Overbury, and Earle.

The period of decadence in Greek literature begins with the extinction of free political life in the Greek cities. So long as the Greek commonwealths were independent and vigorous, Greek life rested on the identity of the man with the citizen. The market-place, the assembly, the theater, were places of frequent meeting, where the sense of citizenship was quickened, where common standards of opinion or feeling were formed. Poetry, music, sculpture, literature, art, in all their forms, were matters of public interest. Every citizen had some degree of acquaintance with them, and was in some measure capable of judging them. The poet and the musician, the historian and the sculptor, did not live a life of studious seclusion or engrossing professional work. They were, as a rule, in full sympathy with the practical interests of their time. Their art, whatever its form might be, was the concentrated and ennobled expression of their political existence. Criticism was in the hands of a literary clique or of a social caste. The influence of jealousy or malevolence, and

the more fatal influence of affectation, had little power to affect the verdict. The verdict was pronounced by the whole body of the citizens. The success or failure of a tragedy was decided, not by the minor circumstance that it gained the first or second prize, but by the collective opinion of the citizens assembled in the theater of Dionysus.

Philip of Macedon did not take away the municipal independence of the Greek cities, but he dealt a death-blow to the old political life. The Athenian poet, historian, artist, might still do good work, but he could never again have that which used to be the very mainspring of all such activity—the daily experience and consciousness of participation in the affairs of an independent state. He could no longer breathe the invigorating air of constitutional freedom, or of the social intercourse to which that freedom lent dignity as well as grace. Then came Alexander's conquests; Greek civilization was diffused over Asia and the East by means of Greek colonies in which Asiatic and Greek elements were mingled. The life of such settlements, under the monarchies into which Alexander's empire broke up, could not be animated by the spirit of the Greek commonwealths in the old days of political freedom. But the externals of Greek life were there—the temples, the statues, the theaters, the porticoes. Ceremonies and festivals were conducted in the Greek manner. In private life Greek usages prevailed. Greek was the language most used; Greek books were in demand. The mixture of races would always in some measure distinguish even the outward life of such a community from that of a pure Greek state; and the facility with which Greek civilization was adopted would vary in different places. Syria, for example, was rapidly and completely Hellenized. Judæa resisted the process to the last. In Egypt a Greek aristocracy of office, birth, and intellect existed side by side with a distinct native life. But, viewed in its broadest aspect, this new civilization may be called Hellenism.

Alexandria was the center of Greek intellectual activity from Alexander to Augustus. Its "Museum" or college, and its library, both founded by the first Ptolemy (Soter), gave it such attractions for learned men as no other city could rival. The labors of research or arrangement are those which characterize the Alexandrian period. But it is not for its poetry of any kind that this period of Greek literature is memorable. Its true work was in erudition and science. Aristarchus (156 B.C.), the greatest in a long line of Alexandrian critics, set the example of a more thorough method in revising and interpreting the ancient texts, and may in this sense be said to have become the founder of scientific scholarship. The critical studies of Alexandria, carried on by the followers of Aristarchus, gradually formed the basis for a science of grammar. Translation was another province of work which employed the learned of Alexandria—where the Septuagint version of the Old Testament was begun, probably about 300–250 B.C. Chronology was treated scientifically by Eratosthenes, and was combined with history by Manetho in his chronicles of Egypt, and by Berosus in his chronicles of Chaldæa. Euclid was at Alexandria in the reign of Ptolemy Soter. Alexandria produced a few eminent men of science, some learned poets (in a few cases, of great literary merit), and many able scholars. The preservation of the best Greek literature was due chiefly to the unremitting care of the Alexandrian critics, whose appreciation of it partly compensated for the decay of the old Greek perceptions in literature and art, and who did their utmost to hand it down in a form as free as possible from the errors of copyists. On the whole, the patronage of letters by the Ptolemies had probably as



large a measure of success as was possible under the existing conditions; and it was afforded at a time when there was special danger that a true literary tradition might die out of the world.

The Græco-Roman period in the literature of Hellenism may be dated from the Roman subjugation of Greece. "Greece made a captive of the rough conqueror," but it did not follow from this intellectual conquest that Athens became once more the intellectual center of the world. Under the empire, indeed, the university of Athens long enjoyed a preëminent reputation. But Rome gradually became the point to which the greatest workers in every kind were drawn.

The first part of the Græco-Roman period may be defined as extending from 146 B.C. to the close of the Roman republic. At its commencement stands the name of one who had more real affinity than any of his contemporaries with the great writers of old Athens, and who, at the same time, saw most clearly how the empire of the world was passing to Rome. The subject of Polybius was the history of Roman conquest from 264 to 146 B.C. His style, plain and straightforward, is free from the florid rhetoric of the time. But the distinction of Polybius is that he is the last Greek writer who in some measure retains the spirit of the old citizen-life. The chief historical work which the following century produced—the *Universal History* of Diodorus Siculus—resembled that of Polybius in recognizing Rome as the political center of the earth, as the point on which all earlier series of events converged. In all else Diodorus represents the new age in which the Greek historian had no longer the practical knowledge and insight of a traveler, a soldier or a statesman, but only the diligence, and usually the dullness, of a laborious compiler.

The Greek literature of the Roman empire, from Augustus to Justinian, was enormously prolific. The area over which the Greek language was diffused—either as a medium of intercourse or as an established branch of the higher education—was coëxtensive with the empire itself. An immense store of materials had now been accumulated, on which critics, commentators, compilers, imitators, were employed with incessant industry. In very many of its forms, the work of composition or adaptation had been reduced to a mechanical knack. If there is any one characteristic which broadly distinguishes the Greek literature of these five centuries, it is the absence of originality either in form or in matter. Lucian is, in his way, a rare exception; and his great popularity—he is the only Greek writer of this period, except Plutarch, who has been widely popular—illustrates the flatness of the arid level above which he stands out.

In the manifold prose work of this period, four principal departments may be distinguished. (1) *History*, with *Biography*, and *Geography*. It would exceed the limits of the present summary to notice in detail the works which belong to this and to the other provinces; but it may be useful, for purposes of reference and classification, to give some chief names in each. History is represented by Dionysius of Halicarnassus,—also memorable for his criticisms on the orators and his effort to revive a true standard of Attic prose,—by Josephus, Arrian, Appian, and Herodianus. In biography, the foremost names are Plutarch, Diogenes Laertius, and Philostratus; in geography, Strabo and Pausanias. (2) *Erudition* and *Science*. The learned labors of the Alexandrian schools were continued in all their various fields. Under this head may be mentioned such works as the lexicon of Julius Pollux; the commentaries of Galen on Plato and on Hippocrates; the learned miscellanies of Athenæus, Ælian, and Stobæus; and the

*Stratagems* of Polyænus. (3) *Rhetoric* and *Belles Lettres*.

The most popular writers on the theory of rhetoric were Hermogenes, Aphthonius, and Cassius Longinus—the last the reputed author of the essay *On Sublimity*. Among the most renowned teachers of rhetoric—now distinctively called "Sophists," or rhetoricians—were Dion Chrysostom, Ælius Aristides, Themistius, Himerius, Libanius, and Herodes Atticus. Akin to the rhetorical exercises were various forms of ornamental or imaginative prose—dialogues, letters, essays, or novels. Lucian, in his dialogues, exhibits more of the classical style and of the classical spirit than any writer of the later age; he has also a remarkable affinity with the tone of modern satire, as in Swift or Voltaire. His Attic prose, though necessarily artificial, was at least the best that had been written for four centuries. The Emperor Julian was the author both of orations and of satirical pieces. The chief of the Greek novelists are Xenophon of Ephesus and Longus, representing a purely Greek type of romance, and Heliodorus,—with his imitators Achilles Tatius and Chariton,—representing a school influenced by Oriental fiction. There were also many Christian romances in Greek, usually of a religious tendency. Alciphron's fictitious *Letters*—founded largely on the New Comedy of Athens—represent the same kind of industry which produced the letters of Phalaris and many similar collections. (4) *Philosophy* is represented chiefly by Epictetus and Marcus Aurelius, in both of whom the Stoic element is the prevailing one; by the Neoplatonists, such as Plotinus, Porphyry, Iamblichus; and by Proclus, of that eclectic school which arose at Athens in the fifth century A.D.

The Greek poetry of this period presents no work of high merit. Babrius versified the *Æsopic Fables*; Oppian wrote didactic poems on fishing and hunting; Nonnus and Quintus Smyrnæus made elaborate essays in epic verse; and the Orphic lore inspired some poems and hymns of a mystic character. The so-called *Sibylline Oracles*, in hexameter verse, range in date from about 170 B.C. to 700 A.D., and are partly the expression of the Jewish longings for the restoration of Israel, partly predictions of the triumph of Christianity. By far the most pleasing compositions in verse which have come to us from this age are some of the short poems in the Greek Anthology, which includes some pieces as early as the beginning of the fifth century B.C., and some as late as the sixth century of the Christian era.

The fourth century may be said to mark the beginning of the last stage in the decay of literary Hellenism. From that point the decline was rapid and nearly continuous. The attitude of the church toward it was no longer that which had been held by Clement of Alexandria, by Justin Martyr, or by Origen. There was a Christian Greek literature, and a Christian Greek eloquence of extraordinary power. The laity became more and more estranged from the Greek literature—however intrinsically pure and noble—of the pagan past. At the same time the Greek language—which had maintained its purity in Italian seats—was becoming corrupted in the new Greek Rome of the East. In 529 A.D. Justinian put forth an edict by which the schools of heathen philosophy were formally closed. The golden time of the Byzantine literature was from about 850 to 1200 A.D. Just as this was drawing to an end, a poetry—at first satirical—arose in the popular dialect, which had now decidedly diverged from the literary; and thus the link was made which connects the Byzantine period with the Greek literature of to-day. The Greek language has never died, and the continuity of Greek literature has never been broken.

The literature of the Byzantine period, from the death



of Justinian to the capture of Constantinople by the Turks, is singularly destitute of interest for the general reader. There is not a single work of intense human passion. Not one man appeared gifted with anything like genius. The most notable books are books of history written by those who were themselves actors in the scenes, or at the least were contemporaries, or nearly contemporaries, of the events recorded. There is always a sense of reality about such works, however hazy our general conception of the times may be. Of these historians a full account is given in the article *BYZANTINE HISTORIANS*.

The character of the Byzantine period is seen in the kind of poetry that it produced. There were some good epigram writers in the reign of Justinian, but after his time the anthology received very few additions. Theodorus Prodromus is perhaps of all the Byzantine writers the one that comes nearest to the rank of a poet, yet even this approach is made only in some of his poems in the popular dialect, which have a strong satiric turn and a vein of humor. His more ambitious efforts have no claim to the title of poetry. The subjects are of wide range and various form—epistles, congratulatory addresses, historical and didactic poems.

Dramatic poetry was also neglected, but enough was produced to keep up the continuity in the tradition of the drama. We have already seen that Prodromus composed dramas. The most voluminous writer in this department is Manuel Philes of Ephesus, who flourished from about 1280 to 1330, and who himself probably acted on the stage. His dramas are occupied with the exhibition of the great deeds of his patrons, or resemble in some respects our Moralities, making characters of the various virtues.

When we pass from poetry to prose we meet with the same want of creative power. The Byzantines collect the writings of others and annotate, but they give us no original works. They performed two services to literature. They handed down the forms of literary expression, and by their indefatigable energy in excerpting and embodying in their own works the works of others, they have preserved for us many valuable documents of antiquity, or at least portions of them.

Several of the Byzantines attained to high eminence in the cultivation of science, but sometimes their exertions took a fruitless direction, especially when they aimed at discovering the method of converting the baser metals into gold. It is in the study of grammar, in the production of lexicons and the annotation of the classical writers, that their best men have gained for themselves a name.

In narrating the history of modern Greek literature several difficulties of a peculiar nature present themselves which do not emerge in an account of the literature of previous periods. The literature is no longer homogeneous, and we have to answer for ourselves the question whether we are to record the literary efforts made by Greeks or the literary efforts made in Greek. We have to divide even those who used Greek into two classes—those who used the ancient language and those who used the modern, though many have used both forms. The ancient language was still the literary language at the time of the capture of Constantinople, and the use of it as a vehicle of literature has been handed down in unbroken tradition to the present day. This has been specially the case with ecclesiastical writers. The church service is in ancient Greek. The New Testament is still read in the original language in Greek churches. The learned priests were familiar with the ancient language, and in learned treatises felt bound, by a firmly impressed tradition, to use only the language which the great fathers of the church had used. Cultivated

Greeks in all lands still continued to make verses in imitation of the ancients. A change took place when Greece revived, in the nineteenth century. All the great writers felt that it was pedantic to adopt many of the old forms of inflection and construction—that, in one word, the ancient language was not fitted to be the vehicle of modern civilization. They therefore resolved to adapt it, to omit what might fetter the full and free expression of modern thought, but to retain at the same time the body and substance of the language. And hence arose a form of the language which is practically identical with the ancient, but transfused with modern ideas, and fitted for the clear and rapid expression of modern literature. The influence of the ancient language on the modern is manifest in every part of it. And it could not be otherwise. Education is spread over every corner of free Greece. But in education the Greek child does not learn the grammar of the modern language but of the ancient. He often reads ancient books, and every cultivated Greek becomes as familiar with Xenophon and Plutarch as an Englishman is with Shakespeare and Milton. Before entering on the history of modern Greek literature, it is necessary to trace the modern language through its various stages. Historians of the Greek language acknowledge that along side of the literary language there existed a conversational, which must have varied in different localities.

After the fall of Constantinople some of the learned Greeks took an interest in the popular form of the language, and one of them, Sophianos, composed a grammar in the first half of the sixteenth century, which Legrand has published, along with a translation by the same scholar of Plutarch's treatise *On the Education of the Young*, into modern Greek. This grammar proves that the popular form of Greek was by that time fully developed, and might still be taken as a good exposition of the ordinary spoken language of illiterate Greeks. Of course there were great varieties in this popular form. Almost every small district and every island had inflections, constructions, and words peculiar to itself.

In narrating the history of this literature, we have, at the earliest stage, to treat separately those who used the classical language and those who used the vulgar. In both cases we cannot draw a fast line at the date of the fall of Constantinople; for, though that event is of great importance in the history of the Greeks as a people, it does not constitute a break in the literary history. It is often imagined that the dispersion of the Greeks in 1453 stood in close connection with the revival of literature in Western Europe. But the fact is, that the Greeks had come into contact with the Westerns long before, and their influence had become decided before the Turks seized the capital of the Greek empire. The crusades had brought Greeks and Latins together. The Latin empire in Constantinople had made the contact still more frequent.

From the earliest times the Greeks were in the habit of putting into verse any remarkable occurrence that stirred their feelings. Crusius tells us that, in his time, Greeks, especially on the islands, contended with each other in repeating or extemporizing verses, and the custom has remained down to the present day. Accordingly the Greek popular poetry is rich in historical subjects. We have already noticed the poems on the battle of Varna and on the taking of Constantinople. There is also a chronicle of the conquest of the Morea (given by Ellissen in his *Analekten*). There are several lamentations over the fall of Constantinople. And the klephtic ballads relate real adventures. Almost every leader in the war of independence had his song in his honor. Some have thought that the largest portion of the ballad poetry of the Greeks is recent; but Legrand's collection, lately



published, shows that some of them belong to very early times, being edited from a manuscript of the sixteenth century. There are two or three famous historical poems connected with the islands. Especially noteworthy is one on the exploits of Mercurios Boua by Coronæos.

There are three poems belonging to the sixteenth and seventeenth centuries which have obtained wide popularity among the Greeks. The first is the *Erotocritos*, the epic poem of modern Greece, of about 11,400 lines. Of its author Vincenzo Cornaro, a Cretan, we know almost nothing; but it is probable that he belonged to a noble Venetian family and lived in the middle or toward the end of the sixteenth century. The tale is one of two lovers who, after many trials of their fidelity to each other, are at last united and blessed. There is genuine poetry in the work. The second poem is a drama called *Erophile*, and its theme is the love of Panaretos and Erophile. The author of it was Georgios Chortakis, who was brought up in Rhethymnos, a Cretan town, and lived toward the end of the sixteenth and beginning of the seventeenth century. It was thought to be nearly the only drama of this period; but Sathas has brought to light the fact that there was a considerable number of them, and he has already published three, *Zeno*, *Stathes*, and *Gyparis*, in addition to the *Erophile*. Some of them are translations, and all of them are closely connected with Italian dramas of the same period. The *Erophile* has interludes to each act, dealing with an entirely different theme, and most probably written by a different author. The third poem, *The Shepherdess*, is a charming idyll written by Nicolaos Demetrios, a native of Apocorone in Crete, who lived in the beginning of the seventeenth century.

There are few prose productions of any importance belonging to the early period of modern Greek literature. Crusius mentions works written by Malaxos, Zigomalas, and Canavoutzis. Sathas has more recently brought to light a number of chroniclers, such as those in the second volume of his *Bibliotheca Græca Medii Ævi*, that relates the history of Cyprus, Leontios Machaira, in the beginning of the fifteenth century, and Georgios Boustronios, whose narrative extends from 1456 to 1501.

In the eighteenth century a revival of enthusiasm for education and literature took place among the Greeks. Schools were established in every important Greek city, school books and translations from Continental languages poured forth from the presses of Venice, Trieste, Vienna, and other places where the Greeks had influence. The leaders in this movement were Eugenios Bulgaris, Nikephoros Theotokis, and Adamantios Corais. The first two, both natives of Corfu, were devout adherents of the Greek Orthodox Church, warm partisans of Russia, and both became archbishops in the Russo-Greek Church. They were true but narrow patriots. They wrote much in defense of Greek orthodoxy as against Latin heresy. Bulgaris also wrote on philosophy and Theotokis on physics, and the latter prepared or translated educational treatises on physics, mathematics, and geography. Far before these stands Adamantios Corais, who was above everything a Greek of widest aim and of the greatest culture.

From the time of Corais we may date a new era in the history of the literature. Henceforth the works become exceedingly numerous, and efforts are made in every direction of literary activity. Perhaps no nation now produces so much literature in proportion to its numbers. The Greeks seem restless in their desire to give expression to their thoughts. They have indeed great difficulties to contend with in the way of publishing. The number of readers is necessarily small, owing to the smallness of the nation. To take an instance,

one of their most important periodicals, the *Athenæum*, containing articles on archæology and literary history, which should be known to all scholars, had not more than 150 subscribers in 1876, as we are informed in the preface; 600 copies were published, of which 100 were sent by the university of Athens to the various libraries in Europe and America, 150 were distributed free, and only 150 were subscribed and paid for. The number of subscribers had not increased in August, 1879. In these circumstances many rich Greeks have come nobly forward and published books at their own expense. The Greeks have also contributed much to a knowledge of the ancient Greek language. Asopios has gained a great name in this direction, and the contributions of Constantinos Contos are very valuable. They have also done much to collect materials for a knowledge of existing dialects. Investigations have been made into the dialects of the Tzaconians by Economos and Neo-Locrian by Chalkiopoulos, and lists of peculiar words and forms to be found in Cythera, Chios, Crete, Cyprus, Locris and other places, have appeared in *Pandora* and other journals. Castorchis has written much and well on Latin literature. The Greeks have a very large number of newspapers and journals, if we consider the number of the population; but, as might be expected, their existence is precarious, and many are short lived. Translations abound in modern Greek, especially from the French, but the Greeks have also translated classical English and German works and novels of all kinds.

GREEK CHURCH, THE, or more properly the Eastern Church, is both the source and background of the Western. Christianity arose in the East, and Greek was the language of the Scriptures and early services of the church, but when Latin Christianity established itself in Europe and Africa, and when the old Roman empire fell in two, and the eastern half became separate in government, interests, and ideas from the western, the term Greek or Eastern Church acquired gradually a fixed meaning. It denoted the church which included the patriarchates of Antioch, Alexandria, Jerusalem, and Constantinople, and their dependencies. The ecclesiastical division of the early church, at least within the empire, was based upon the civil. Constantine introduced a new partition of the empire into dioceses, and the church adopted a similar division. The bishop of the chief city in each diocese naturally rose to a pre-eminence, and was commonly called *exarch*—a title borrowed from the civil jurisdiction. In process of time the common title *patriarch* was restricted to the most eminent of these exarchs, and councils decided who were worthy of the dignity. The council of Nicæa recognized three patriarchs—the bishops of Rome, Alexandria, and Antioch. To these were afterward added the bishops of Constantinople and Jerusalem. When the empire was divided there was one patriarch in the West, the bishop of Rome, while in the East there were at first two, then four, and latterly five. This geographical fact has had a great deal to do in determining the character of the Eastern Church. It is not a despotic monarchy governed from one center and by a monarch in whom plenitude of power resides. It is an oligarchy of patriarchs. It is based, of course, on the great body of bishops; but episcopal rule, through the various grades of metropolitan, primate, exarch, attains to sovereignty only in the five patriarchal thrones. Each patriarch is, within his diocese, what the Gallican theory makes the pope in the universal church. He is supreme, and not amenable to any of his brother patriarchs, but is within the jurisdiction of an œcumenical synod. This makes the Greek Church quite distinct in government and traditions of polity



from the Western. It has ever been the policy of Rome to efface national distinctions, but under the shadow of the Eastern Church national churches have grown and flourished. Revolts against Rome have always implied a repudiation of the ruling principles of Ultramontanism; but the schismatic churches of the East have always reproduced the ecclesiastical polity of the church which they have deserted.

The Greek Church, like the Roman, soon spread out far beyond the imperial dioceses which at first fixed its boundaries, but, unlike the Roman, it did not keep for Christianity all the lands it had once laid hold of. What Rome Christianized, with the exception of Africa, remained Christian. The old empire was overrun by the barbarians, but the conquered empire imposed its law and its religion upon its conquerors, and pagan and heretic became in the end Catholic Christians. In the East it was otherwise. The empire maintained itself long and died hard; but its decline and fall meant not merely the overthrow of the supremacy of the emperors of the East, it meant also the destruction of civilization and the submergence of Christianity. In the West, German and Saxon, and Goth and Lombard, became Christian law-abiding people. In the East Arab and Kurd, the Seljuk and Ottoman Turk, remained what they were before they swarmed over the Eastern empire, and could never be taught either law or gospel. It is true that the Eastern Church more than made up for her losses by her missionary enterprise, but she never conquered her conquerors, and the historian is too apt to speak of her past glories and forget her present strength. The same reason also makes it difficult to describe, with any accuracy, the extent of the Greek Church. She has shifted her position so often that to describe her extent at any one period must be misleading. The church never at any one period occupied all the territories she has possessed.

The patriarchate of Antioch has undergone most changes in extent of jurisdiction, arising from the transfer of sees to Jerusalem, from the progress of the schismatic churches of the East, and from the conquests of the Mahometans. At the height of his power the patriarch of Antioch ruled over twelve metropolitans and 250 suffragan bishops. In the time of the first crusade 153 still survived; now there are scarcely twenty. Most of those that remain are called either metropolitan or archiepiscopal sees, but they have few or no suffragans.

In the earlier period of the church, ecclesiastical followed civil divisions so closely that Jerusalem, in spite of the sacred associations connected with it, was merely an ordinary bishopric dependent on the metropolitan of Cæsarea. Ambitious prelates had, from time to time, endeavored to advance the pretensions of their see, but it was not until the council of Chalcedon, in 451, that Jerusalem was made a patriarchate with jurisdiction over Palestine. From this time, on to the inroad of the Saracens, the patriarchate of Jerusalem was highly prosperous. It ruled over three metropolitans with eighty suffragans. The modern patriarch has seven suffragans, all of whom enjoy the titles of metropolitan or archbishop — Cæsarea, Scythopolis (Bethshan), Petra, Ptolemais, Sinai, Nablous, Samaria. The patriarchs, however, are non-resident (they live in Constantinople), and the primate of Palestine is the metropolitan of Cæsarea.

The patriarch of Alexandria, in ancient times, possessed much more power than the others, and the church ruled by him was much more centralized. He had no metropolitans. His hundred suffragans were ordinary bishops. This perhaps in part accounts for the decay of the Orthodox church in Egypt; at present there is no

bishop but the patriarch. The Christians in Egypt are, for the most part, Monophysites. The church of Nubia has been blotted out. The church of Æthiopia or Abyssinia is Monophysite, and acknowledges the Jacobite patriarch of Cairo.

The great dogmatic work of the Greek church was the definition of that portion of the creed of Christendom which concerns *theology proper* — the doctrines of the essential nature of the Godhead, and the doctrine of the Godhead in relation with mankind in the incarnation, while it fell to the Latin church to define *anthropology*, or the doctrine of man's nature and needs. The controversies which concern us are all about the person of Christ, the Theanthropos, for they alone are represented in the schismatic churches of the East.

All the churches of the East, schismatic as well as orthodox, accept unreservedly the decrees of the first two councils. The schismatic churches protest against the additions made to the creeds of Nicæa and Constantinople by succeeding councils. The Nicæa-Constantinopolitan creed declared that Christ was *consubstantial* with the Father, and that He *had become man*. Disputes arose when theologians tried to explain the latter phrase. These differences took two separate and extreme types, the one of which forcibly separated the two natures so as to deny anything like a real union, while the other insisted upon a mixture of the two, or an absorption of the human in the divine. The former was the creed of Chaldæa and the latter the creed of Egypt; Chaldæa was the home of Nestorianism, Egypt the land of Monophysitism. The Nestorians accept the decisions of the first two councils, and reject the decrees of all the rest as unwarranted alterations of the creed of Nicæa. The Monophysites accept the first three councils, but reject the decree of Chalcedon and all that come after it.

The council of Ephesus, the third œcumenical, had insisted upon applying the term Theotokos to the Virgin Mary, and this was repeated in the symbol of Chalcedon, which says that Christ was born of the Virgin Mary, the Theotokos, "according to the manhood." The same symbol also declares that Christ is "to be acknowledged in two natures, \* \* \* indivisibly and inseparably." Hence the Nestorians, who insisted upon the duality of the natures to such a degree as to lose sight of the unity of the person, and who rejected the term Theotokos, repudiated the decrees both of Ephesus and of Chalcedon, and upon the promulgation of the decrees of Chalcedon formally separated from the church. Nestorianism had sprung from an exaggeration of the theology of the school of Antioch, and the schism weakened that patriarchate and its dependencies. It took root in Chaldæa, and became very powerful. No small part of the literature and science of the Mahometan Arabs came from Nestorian teachers, and Nestorian Christianity spread widely. Their principal bishop took the title of patriarch of Babylon. His seat was later removed to Baghdad and then to Mosul; it is now at Julamerik in Kurdistan. In the eleventh century he ruled over twenty-five metropolitans, and his jurisdiction extended from the Tigris to China, from Lake Baikal to South India. Persecutions weakened the church, Timur almost extirpated it. In the sixteenth century a schism occurred; many of the Nestorians yielded obedience to Rome. The Roman Nestorians are usually called Chaldæans, though all lay claim to the title. At present the patriarch rules over two metropolitan and sixteen suffragan bishops. The Nestorians dwell principally in Kurdistan, though many are found in Mesopotamia and in India. In the latter country they are numerous on the Malabar coast, and are called Thomas Christians.

The term "Jacobite" (from Jacobus Baradæus, a



Syrian theologian) is properly confined to the Syrian Monophysites, but is sometimes used to denote all the various divisions of this heresy. The Jacobites, therefore, accept the first three councils and reject those that follow. The Armenian Church does the same, and it is common to class the Armenians with the Jacobites, while some theologians have made them more heretical than the Jacobites of Syria and Egypt. This, however, seems a wrong opinion, and the Armenians ought to be reckoned as Orthodox (see ARMENIAN CHURCH). Apart, however, from theological criticism, the Jacobites are arranged under three patriarchates—Antioch, Alexandria, and Armenia. Antioch and Alexandria have intercommunion, but Armenia, in spite of times of reconciliation, stands apart. The Jacobites or Copts of Egypt greatly outnumber the members of the Orthodox Greek Church there. The patriarch assumes jurisdiction over Egypt, Jerusalem, Nubia, Abyssinia, and the Pentapolis. He now resides in Cairo, and is chosen by lot in a council of all the bishops from a number of monks recommended by four convents to whom belongs this privilege. He has for suffragans the bishops of Menouf, Sherkeyeh, Behnese, Fayoum, Miniyeh, Senabau, Manfalout, Siout, Abuteg, Aschumin, Esne, Kauss and Nekada, and Khartoum. He has besides jurisdiction over twenty-six monasteries, and rules nominally over the Church of Abyssinia.

The Syrian Jacobites also form a patriarchate—the patriarchate of Antioch. While Antioch belonged to the empire the persecution of the state drove the Jacobite patriarch from the city. He settled at Amida, now called Caramit, which is still the ecclesiastical center. The second dignitary is the maphrian (fruitbearer) of the East, who was originally a missionary bishop to the regions east of the Tigris. He is now settled at Mosul. The Syrian Jacobites could at one time boast twenty metropolitans and one hundred and three bishops; now there are only five metropolitans (Caramit, Mosul, Maadan, Aleppo, and Jerusalem) without suffragans.

The decisions of Chalcedon, which were the occasion of the formation of all these sects outside, did not put an end to Christological controversy inside the Orthodox Greek Church. The most prominent question which emerged in attempting to define further the person of Christ was whether the will belonged to the nature or the person, or, as it came to be stated, whether Christ had two wills or only one. The church in the sixth œcumenical council at Constantinople declared that Christ had two wills. The Monothelites refused to submit, and the result was the formation of another schismatic church—the Maronite Church of the Lebanon range. The Maronites, however, in the twelfth century were reconciled to Rome, and cannot now be said to belong to the Greek Church.

The relation of the Greek Church to the Roman may be described as one of growing estrangement from the fifth to the eleventh century, and a series of abortive attempts at reconciliation since the latter date. The estrangement and final rupture may be traced to the overweening pretensions of the Roman bishops and to Western innovation in the doctrine of the Holy Spirit, accompanied by an alteration of creed. In the early church three bishops stood forth prominently, principally from the political eminence of the cities in which they ruled—the bishops of Rome, Alexandria, and Antioch. The transfer of the seat of empire from Rome to Constantinople gave the bishops of Rome a possible rival in the patriarch of Constantinople, but the absence of an over-awing court and meddling statesmen did more than recoup the loss to the head of the Roman Church. The theological genius of the East was different from that of the West. The Greek theology had its roots in Greek

philosophy, while a great deal of Western theology was based on Roman law. The Greek fathers succeeded the Sophists; the Latin theologians succeeded the Roman advocates. This gave rise to misunderstandings, and at last led to two widely separate ways of regarding and defining one important doctrine—the procession of the Holy Spirit from the Father or from the Father and the Son. Political jealousies and interests intensified the disputes, and at last, after many premonitory symptoms, the final break came in 1054, when Leo IX. smote Michael Cerularius and the whole of the Eastern Church with an excommunication. There had been mutual excommunications before, but they had not resulted in permanent schisms. Now, however, the separation was final, and the ostensible cause of its finality was the introduction by the Latins of two words *filioque* into the creed. It is this addition which was and which still remains the permanent cause of separation. Ffoulkes has pointed out in his second volume (ch. 1-3) that there was a resumption of intercourse more than once between Rome and Constantinople after 1054, and that the overbearing character of the Norman crusaders, and finally the horrors of the sack of Constantinople in the fourth crusade, were the real causes of the permanent estrangement. It is undeniable, however, that the *filioque* question has always come up to bar the way in any subsequent attempts at intercommunion. The theological question involved is a very small one, but it brings out clearly the opposing characteristics of Eastern and Western theology, and so has acquired an importance far beyond its own worth. The question is really one about the relations subsisting between the persons of the Trinity and their hypostatical properties. The Western Church affirms that the Holy Spirit “proceeds from” the Father and from the Son. It believes that the Spirit of the Father must be the Spirit of the Son also. Such a theory seems alone able to satisfy the practical instincts of the West, which did not concern itself with the metaphysical aspect of the Trinity, but with Godhead in its relation to redeemed humanity. The Eastern Church affirms that the Holy Spirit proceeds from the Father only. The Eastern theologian thinks that the Western double procession degrades the Deity and destroys the perfection of the Trinity. The double procession, in his eyes, means two active principles in the Deity, and it means also that there is a confusion between the hypostatical properties; a property possessed by the Father and distinctive of the First Person is attributed also to the Second. This is the theological, and there is conjoined with it an historical and moral dispute. The Greeks allege that the addition of the words *filioque* was made, not only without authority, and therefore unwarrantably, but also for the purpose of forcing a rupture between East and West in the interests of the barbarian empire of the West.

Attempts at reconciliation were made from time to time afterward, but were always wrecked on the two points of papal supremacy, when it meant the right to impose Western usages upon the East, and of addition to the creed. First there was the negotiation between Pope Gregory IX. and the Greek patriarch Germanus. The Latin conditions were practically recognition of papal jurisdiction, the use of unleavened bread enforced on the Greeks, and the Greeks to be permitted to omit *filioque* on condition that they burnt all books written against the Western doctrine. The Greek patriarch refused the terms. Then came negotiations under Innocent IV. and Clement IV., in which the popes proposed the same conditions as Gregory IX., with additions. These proposals were rejected by the Greeks, who regarded them as attempts to enforce new creeds on their church.

The negotiations at the council of Lyons (1274) were,



strictly speaking, between the pope and the Greek emperor, and were more political than ecclesiastical. Michael Palæologus ruled in Constantinople while Baldwin II., the last of the Latin emperors, was an exile in Europe. Palæologus wished the pope to acknowledge his title to be emperor of the East, and in return promised submission to the papal supremacy and the union of the Greek with the Latin Church on the pope's own terms. This enforced union lasted only during the lifetime of the emperor. The only other attempt at union which requires to be mentioned is that made at the council of Florence. It was really suggested by the political weakness of the Byzantine empire and the dread of the approach of the Turks. John Palæologus the emperor, Joseph the patriarch of Constantinople, and several Greek bishops came to Italy and appeared at the council of Florence—the papal council, the rival of the council of Basel. As on former occasions the Greeks were at first deceived by false representations; they were betrayed into recognition of papal supremacy, and tricked into signing what could afterward be represented as a submission to Western doctrine. The natural consequences followed—a repudiation of what had been done; and the Greek bishops on their way home took care to make emphatic their ritualistic difference from Rome. Soon after came the fall of Constantinople, and with this event an end to the political reasons for the submission of the Greek clergy. Rome's schemes for a union which meant an unconditional submission on the part of the Greeks did not cease, however, but they were no longer attempted on a grand scale. Jesuit missionaries after the Reformation stirred up schisms in some parts of the Eastern Church, and in Austria and Poland many of the Greeks were compelled to submit themselves to the see of Rome. The result of these schemes has been what is called the *Unia*, or the United Greeks. These various unions have commonly arisen from dissensions among the Greeks themselves when a portion of dissentients have made submission to Rome. Rome commonly promised to allow them to enjoy their own liturgies and rights of worship, but usually broke her promises. This was done so systematically that the college of the Propaganda prints what profess to be the old liturgies of the Eastern churches, which are really so interpolated as to bring them surreptitiously into harmony with the Western rites. This is done so universally that it is impossible to trust to any professedly Eastern creed or service-book printed at the office of the Propaganda in Rome.

The number of adherents of the Greek Church at this date may be given approximately as follows:

|                                                              |                  |
|--------------------------------------------------------------|------------------|
| Orthodox Greek Church in Turkey.....                         | 10,000,000       |
| “ “ Roumania.....                                            | 4,529,000        |
| “ “ Servia.....                                              | 1,345,000        |
| “ “ Montenegro.....                                          | 130,000          |
| “ “ Greece.....                                              | 1,310,000        |
| “ “ Austria.....                                             | 3,000,000        |
| “ “ Russia (including Poland, Siberia and the Caucasus)..... | 58,000,000       |
|                                                              | <hr/> 78,314,000 |

To these may be added:

|                                                       |                 |
|-------------------------------------------------------|-----------------|
| Russian Dissenters.....                               | 1,051,000       |
| Armenians.....                                        | 3,000,000       |
| Nestorians (including the Thomas Christians of India) | 360,000         |
| Syrian Jacobites.....                                 | 90,000          |
| Copts.....                                            | 121,000         |
| Abyssinians.....                                      | 1,200,000       |
|                                                       | <hr/> 5,822,000 |
| United Greeks (chiefly in Austria and Poland).....    | 4,670,000       |

GREEK EMPIRE. See GREECE, *ante*.

GREEK FIRE is properly the name applied to the inflammable and destructive compounds used in warfare

in the Middle Ages, and particularly by the Byzantine Greeks at the sieges of Constantinople. It was the precursor of gunpowder, and of such modern compositions as dynamite and nitroglycerine, and was frequently accessory to gunpowder for many years after its invention. But combustible mineral substances were employed in war much earlier than the Middle Ages. Greek fire has borne the names wildfire, maritime fire, wet fire, and fire-rain. The secret of the composition of the ancient Greek fire was so well kept that its constituents are not positively known, but they are believed to have been powdered resin, naphtha, sulphur, saltpeter, etc. During the American civil war a compound of saltpeter, sulphur and lampblack was used at the siege of Charleston with great effect. Bunsen's kakodyle—more on the order of the Chinese stinkpot, owing its deadly efficacy to the arsenic it contains—is among the most fatal of the modern variations of the older forms of such agents.

GREELEY, HORACE, editor, born at Amherst, N. H., Feb. 3, 1811; died near New York Nov. 29, 1872. He was the son of a farmer, and removed to Vermont with his parents in 1821. At fifteen years of age he entered a printing office and worked four years at the case. In August, 1831, he reached New York with only a few dollars in his pocket, and obtained work as a journeyman. In January, 1833, he and another printer named Francis V. Story, bought some type on credit and began on their own account as job printers. Their first work was on the *Daily Post*, the first daily penny paper ever published. It lasted three weeks. Then the firm of Greeley & Co. issued the *New Yorker*, a literary weekly, which was kept alive for several years. In 1836, Mr. Greeley, who had adopted the Universalist faith, married Miss Cheney, of North Carolina.

Greeley's next journalistic venture was *The Jeffersonian*, a Whig campaign paper, which closed its career early in 1839. His next publication was *The Log Cabin*, a weekly which supported General Harrison for president in the campaign of 1840, and met with unprecedented success. In April, 1841, the first number of the *New York Tribune* appeared. It was a small sheet and sold for one cent, but to its development into a great and influential newspaper Mr. Greeley devoted his life. His associate editor was Henry J. Raymond, a young New Yorker, and among the contributors to the early issues were Charles A. Dana, George William Curtis, Margaret Fuller, Bayard Taylor, and other prominent persons. The *Tribune* prospered from the start, but was hampered by Greeley's eccentricities and wretched business management. Beginning as a Whig organ, it became the champion of the Anti-Slavery Whigs, and after 1856 supported the Republican party. It advocated the election of Henry Clay in 1844, of General Scott in 1852 of Fremont in 1856, of Lincoln in 1860 and 1864 and of Grant in 1868. Through its columns Mr. Greeley introduced to the American public the social heresies of Fourier and the spirit-rapping frauds of the Fox sisters. He advocated a protectionist policy, the abolition of slavery, and the encouragement of coöperation, and he opposed capital punishment, and favored the cause of education. For many years the *Tribune*, which several times advanced its price, and more often increased its size, was the printed embodiment of Horace Greeley, and in the minds of thousands of readers the man and the paper were inseparably connected. During the civil war the circulation of the daily often exceeded 60,000, while the weekly edition, by which every Republican in the East swore, sometimes numbered a quarter of a million copies.

Mr. Greeley's essays in political life, when he left the



privacy of his office to engage openly on the floor of the legislature, were not very successful. In 1848 he filled a three months' vacancy in Congress, during which time he exposed the abuses of the mileage system by members. In 1861, and again in 1867, he was an unsuccessful candidate for the United States Senate. He was a delegate-at-large to the New York Constitutional Convention of 1867, but paid little attention to its proceedings. In 1869 he was defeated for State Comptroller, and in 1870 for Congress. His opposition to slavery intensified as time went on. He opposed the Mexican war and sympathized with the free-soil movement. As the clouds of war began to close over the republic in the winter of 1860-61, Mr. Greeley seemed to lose heart, and declared against coercion of the dissentient States. But the sound of the guns at Sumter awoke him, and he rushed, as was his wont, to the other extreme. In 1864 Mr. Greeley went to Canada, with the consent of the government, to consult with some so-called confederate commissioners in the interest of peace. The negotiations came to nothing, owing to the want of authority of the alleged commissioners. After the war closed, Greeley advocated universal amnesty, and later signed the bail-bond of Jefferson Davis. A storm of indignation in the North greeted this chivalrous action, and the sale of Greeley's *History of the American Conflict*, the second volume of which was then just printed, was completely ruined.

In 1872, Mr. Greeley was nominated for president by a party called the Liberal Republicans, and thereafter by the Democrats. The Grant ticket had a popular majority of three-quarters of a million, and Mr. Greeley did not carry one Northern State, and only six of the Southern sisterhood. On November 29, 1872, he died.

**GREENBACK PARTY.** After the close of the civil war there followed a period of financial contraction which culminated in 1873 in a financial crisis, in gigantic failures and a commercial panic. During that period the nation was slowly "getting down to hardpan" in the matter of the currency. The exigencies of the war had necessitated the issue of "greenbacks" in vast quantity, and as a natural consequence gold appreciated as compared with paper. The debtor class benefited during the flush times of the war, for money was plenty (of its kind), and they discharged their mortgages and debts incurred in ante-war times with this plentiful money. But as the paper dollar appreciated slowly but steadily to a gold value, wages were reduced and prices fell. The creditor class then got their innings. Money became tight, credits were cut down, and there was a stringency in the money market which in 1873 amounted almost to a national disaster.

The wage-workers and the agriculturists suffered most while this process was going on, and there were not wanting politicians who took advantage of the situation for their personal ends. As early as 1868 the "Ohio idea" was enunciated, that all United States bonds which did not specifically call for payment in coin should be redeemed in greenbacks. The greenback was fondly spoken of as "the money of the people," and the point was raised that capitalists were being paid one hundred cents for bonds which cost them thirty-five to forty cents on the dollar. At political conventions, the doctrine of redemption in greenbacks was made a plank.

In 1873 the panic culminated. In 1874 a greenback party was organized. It called for the withdrawal of the national bank note currency, and the creation and practically unlimited issue of a paper currency

exchangeable for bonds bearing interest at the rate of 3.65 per cent. per annum. It was further provided that all bonds should be redeemed and the interest on them paid in greenbacks, except where repayment in coin had been specifically promised.

Two years later the party had grown big enough to put a presidential ticket in the field. Peter Cooper, of New York, was nominated for president, and Samuel F. Cary, of Ohio, for vice president, and they received about 80,000 of the popular vote.

In 1878 the National Labor party joined forces with the Greenbackers.

In 1880 they nominated James B. Weaver, of Iowa, for president, and B. J. Chambers, of Texas, for vice president. These gentlemen received a popular vote of over 300,000, and this time eight Greenback-Labor congressmen were elected.

In 1884 Benjamin F. Butler got the presidential nomination, and a popular vote of 133,728.

**GREEN BAY**, capital of Brown county, Wisconsin, is situated at the head of Green Bay, an inlet on the west shore of Lake Michigan. The bay is one hundred miles long, from fifteen to thirty-five miles wide, and of considerable depth. The city stands near the mouth of Fox river, with a small stream known as the East river on the other side, its situation affording it a secure harbor. It is 242 miles north of Chicago, 114 north of Milwaukee, and 120 northeast of Madison, the capital of the State. By the completion of a canal connecting the Fox and Wisconsin rivers at Portage City, Green Bay has become the terminus of the inland water system which unites the great lakes with the Mississippi, and the Gulf of St. Lawrence with the Gulf of Mexico. The nearness of Green Bay to the forests of the State makes it a center of the lumber trade, and it exports annually large quantities of planks, boards, shingles, staves and headings. Population, 9,069.

**GREENBUSH**, a village in Rensselaer county, N. Y., on the east bank of the Hudson, opposite Albany. It is the terminus of two railroads, contains freight houses and machine shops, factories, tanneries and banks, and a population (1890) of 7,287.

**GREENCASTLE**, capital of Putnam county, Ind., thirty-eight miles west by south of Indianapolis; stands at the intersection of the Louisville, New Albany and Chicago, the Indianapolis and St. Louis, and the St. Louis, Vandalia, Terre Haute & Indianapolis railroads. It contains two national banks, four weekly papers, one monthly magazine, seven churches, a high school and graded schools, the Asbury University, also a female college, and manufactures of lumber, pumps, hardware novelties, woolen goods, etc. The city is the center of a large trade. Population (1890), 6,000.

**GREENSBORO**, the capital of Guilford county, North Carolina, is situated on the Richmond and Danville, and the Cape Fear and Yadkin Valley railroads, eighty-one miles northwest of Raleigh. The city is steadily growing in importance as a manufacturing center, and now contains about twenty establishments producing an annual output of about \$5,000,000 in value, consisting principally of iron, steel, lumber, and tobacco. The city also contains four banks, one daily, four weekly, and three monthly publications, two graded schools, a female college, and a seminary for the education of colored teachers, thirteen churches, a court-house, a post-office building completed at a cost of \$70,000, hotels, public halls, and other improvements. The city is lighted by electricity, and is provided with police, fire, water, and sewerage departments. Population, 3,317.



















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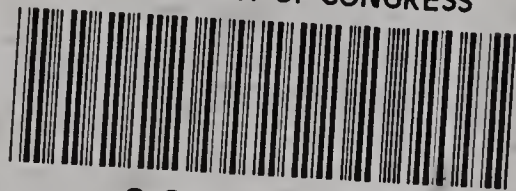
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